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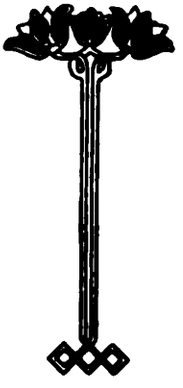
SUGAR AT A GLANCE

CHARTS AND DATA

Prepared by TRUMAN G. PALMER

Concerning National Economy and the High Cost of Living as Affected by the Increased Yield of Other Crops When Grown in Rotation with Sugar Beets : : : : :



WASHINGTON
1912

SUGAR AT A GLANCE.

The Influence of Sugar-Beet Culture on Agriculture, and its Importance in Relation to National Economics.

By TRUMAN G. PALMER.

"The high yield of cereals and other grains in beet regions dated from the introduction of rational sugar-beet culture."— Dr. von Rumker, Professor of Agriculture, University of Breslau (Silesia), Germany.

WASHINGTON, D. C.
1912.

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MAR 3 1913

TRUMAN G. PALMER
901-903 UNION TRUST BUILDING
WASHINGTON, D. C.

July 27, 1912.

MY DEAR SENATOR:

In preparing the charts and tables herewith the official figures of the various nations to which they relate have been used as a basis, wherever Government figures were available.

Where Government figures were not available, the figures of European and American statisticians and statistical societies of established repute have been used, wherever possible.

Where the above mentioned sources had not covered the ground, the charts are based on data gathered on various study trips through the beet fields and sugar factories of the United States and those of the large and small European sugar-producing countries and from personal contact with agricultural economists.

Having devoted fifteen years to the study of the influence of sugar-beet culture in its relation to national economy and the cost of living, and having exercised the utmost care in making and checking the various conversions, I feel justified in stating that no substantial error has crept into the work.

Being drawn to scale the charts convey an accurate impression of the subjects presented.

Sincerely yours,

TRUMAN G. PALMER.

HON. HENRY CABOT LODGE,
Senate Chamber,
Washington, D. C.

IN THE SENATE OF THE UNITED STATES,

August 1, 1912.

Ordered, That the charts and data prepared by Truman G. Palmer concerning the sugar industry, the increased yield of other crops when grown in rotation with sugar beets, and the rise in price of farm and food products be printed as a document.

Attest:

CHARLES G. BENNETT,
Secretary.

SUBJECTS CHARTED

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CHART No. 2.—World production of beet sugar, 1910–11.
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CHART No. 28.—Agricultural progress in the United States and Germany. Sugar beets improve the soil; showing that in becoming the greatest beet-sugar producing country in the world, Germany has increased the yield of OATS to 59 bushels per acre, or 85.9 per cent, while the yield per acre in the United States remains at one-half that amount, the increase in 30 years amounting to only 5.6 per cent.

CHART No. 29.—Agricultural progress in the United States and Germany. Sugar beets improve the soil. Collective average yield of WHEAT, RYE, BARLEY and OATS per acre, 1879–1909, in the United States and Germany; showing an increased yield since 1879 of 80 per cent in Germany, as compared to an increase of 6.6 per cent in the United States.

CHART No. 30.—Agricultural progress in the sugar-beet districts of the United States. Average results secured by 115 American farmers before and after rotating cereal crops with sugar beets; showing an increased yield per acre due to rotation with sugar beets of 27.6 per cent in corn; 48.1 per cent in oats; 49.1 per cent in wheat; 52.0 per cent in barley, an average for the four crops of 44.6 per cent.

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CHART No. 36.—Wheat acreage and yield of Minnesota and Germany in 1907; showing that Germany, as a result of sugar-beet culture, with less acreage to wheat than was sown in Minnesota, harvested nearly double the number of bushels.

CHART No. 37.—Wheat acreage and yield in 1907 of France, and of Minnesota, North Dakota and Kansas; showing that France, as a result of sugar-beet culture, with practically the same acreage to wheat as was sown in these three States, produced more than double the number of bushels.

CHART No. 38.—Wheat versus sugar beets. Relative value of yield per acre; showing that whereas it now requires 8,242,227 acres to produce enough wheat to exchange for the $100,000,000 worth of sugar we import annually, the same amount of sugar could be produced from beets grown on 1,671,421 acres.

CHART No. 39.—Annual loss to Germany and gain to the United States on five crops in 1907 had the agricultural methods of the two nations been reversed; showing that Germany would have lost $900,000,000 and the United States would have gained $1,376,000,000.

CHART No. 40.—Soil fertility of the United States and Germany as affected in 1909 by the principles of national economy adopted by the two nations in regard to sugar; showing that in 1909 the United States, by exporting wheat, cottonseed meal and linseed meal to the value of $100,000,000 in exchange for foreign sugar, lost $35,793,342 worth of fertilizing elements, while Germany, by exporting sugar to the value of $50,000,000 in exchange for these products, gained $28,770,564 in fertilizing elements.

CHART No. 41.—Value of agricultural imports and exports of the United States, 1900 and 1910; showing that, excluding cotton, the value of United States imports exceeds the value of its exports by $267,000,000.

CHART No. 42.—Effect of the Spanish-American war and tariff legislation on the development of the American beet-sugar industry. National enactments the barometer of beet-sugar development; showing the effect of Cuban reciprocity, the sending of troops into Cuba in 1906, and other legislative actions, real or contemplated, on the development of the beet-sugar industry.

SUGAR AT A GLANCE.

INTRODUCTION.

Until recently, outside of scientific agricultural circles, it was a generally accepted conclusion in the United States that sugar-beet culture injured the soil. Farmers so contended, and so universal was the contention that factory managements were compelled to concede that the farmers were right. Certain it was that after having been planted to beets several successive seasons, fields yielded a lower tonnage with each succeeding year.

While the Department of Agriculture pointed out many advantages of sugar-beet culture and urged farmers to engage in it, various agricultural weeklies advised their readers that whatever might be the tonnage per acre and whatever the price of beets per ton, they could not afford to engage in beet culture as it soon would destroy the productivity of their fields and ruin the value of their farms.

Some ten years ago I read in a country weekly the first detailed statement I had seen which purported to show in bushels per acre, just how much sugar-beet culture increased the yield of other crops when grown in rotation with them. The article gave with much particularity the result of a series of experiments which it was claimed had been conducted in Germany, and showed that sugar-beet culture greatly improved the soil. Although unsigned, it bore evidence of sincerity and I republished it in a short history of the beet-sugar industry, only to be met with expressions of incredulity.

Feeling that we in the United States might have failed to discover the magnet which induced the nations of Europe to favor the beet-sugar industry to a far greater extent than they favored other industries, I went there to study conditions at first hand and to verify or disprove the statement contained in the country weekly above noted. I searched for reports of recent experiments on the subject, but was told that there were none; that the facts had been definitely determined many years ago and that there was no more occasion for making such experiments now than to make a resurvey of the distance between Berlin and Vienna—both had been determined beyond question; even the trade press had ceased to give space to it; for decades every European agriculturist had recognized sugar-beet culture as the father of modern scientific agriculture, the keystone to the arch.

It thus became necessary to search for the works of earlier authors. In these works and in conversation with agricultural economists and sugar-beet growers, I discovered the cause of all our trouble, the one reason why the experience of American sugar-beet farmers gave contrary results to those obtained throughout the sugar-beet districts of Europe. American farmers were growing beets on the same soil, year after year, their only thought being "so many tons of beets per acre at so much per ton," whereas, since learning of the indirect value of sugar-beet culture, European farmers use them as a means to increase the yield of other crops rather than for their direct money value, and in order to spread the benefits over as great an area as possible they plant beets on the same soil but one year in three to five. From time to time, this information since has been placed before American sugar-beet farmers, and now, by practical experience, many have learned of the value of sugar-beet rotation and are enthusiastic over the results obtained.

If announcement were made that an Edison or a Burbank had discovered a means whereby each acre in the United States which is devoted to cereal crops could be made to yield two bushels where they now yield but one, regardless of any reasonable expense which might be involved, the discoverer would be greeted as the world's greatest public benefactor, the one who had solved the problem of the high cost of living.

The value of the telephone, the electric light and many other important inventions sinks into insignificance when compared to that of a discovery which enables a country to feed double the number of people which could be fed before its utilization. Such a discovery was made a century ago and was heralded and utilized by the leading nations of Europe, with the result that their worn out soils have been so rejuvenated that now they produce two bushels of grain where formerly they produced but one. But for the fact that Europe learned to rotate her cereal crops with a hoed root crop and thereby doubled her acreage yield of cereals, European nations still would be encouraging and assisting emigration because of inability to feed their increasing population.

Strange as it may seem, this important discovery has not been exploited in the United States. With few exceptions American writers on agricultural topics seem to have been totally oblivious both as to the cause and of the fact that the "worn out soils of Europe" have been so built up that they now produce two bushels of grain where the virgin soils of the United States produce but one. In their ignorance, some American writers even advise our farmers against adopting the very method which has revolutionized agriculture in Europe. And so it follows that American farmers have not profited by it and their yields per acre remain practically stationary, while the crop yields of the balance of the world increase from year to year. During the past thirty years the combined average yield per acre of wheat, rye, barley and oats in the United States has increased but 6.6 per cent, while the acreage yield of the same crops in Germany has increased 80 per cent during the same period.

Experience in the United States and throughout Europe demonstrates conclusively that the introduction of a hoed root crop in the rotation one year in four is a prerequisite to heavy yields of cereal crops. Even though a farmer applies no science to his work save that of devoting his fields to a root crop one year in four, he will reap more bushels per acre of all cereal crops than will the farmer who avails himself of all known scientific agricultural knowledge but fails to introduce a hoed root crop in his cycle of rotation.

The opening of the Panama Canal, the deepening of our inland waterways, the building of good roads, the establishment of a credit system whereby American farmers may secure loans at a low rate of interest, these and other projects are offered as solutions to the high cost of living problem, but it is obvious that important as are all of these projects, their combined influence would reduce the cost of living but slightly in comparison to what it would be reduced if without additional expense, our farmers were enabled to produce two bushels of grain where they now produce one.

While the writings of Cato and Pliny and other ancient agricultural writers indicate that the art of root crop rotation was practiced 2,000 years ago, Great Britain has the distinction of being the first country in modern times to introduce root culture in rotation with cereal crops as a means of increasing the yield of the latter. For a hundred years the basis of British agriculture has been the turnip. In 1805, Thaer, the English agriculturist, wrote a book on the subject of root crop rotation with cereal crops and as a result of his teachings and of those who followed him, British farmers increased their plantings of roots from year to year. They now grow 2,000,000 acres of hoed roots, principally turnips, in rotation with 6,500,000 acres of cereal crops, which accounts for their heavy yield per acre. Thaer's work was translated and placed in the hands of German farmers and for many years German agricultural economists endeavored to induce them to adopt Thaer's methods, but in vain. Two objections defeated all attempts in this direction. First, it required deep plowing, and deep plowing meant that a new crop of stones would be turned up each year to be hauled off the fields. Second, it meant the introduction of a crop which in itself possessed but little money value, had to be fed instead of sold, and was even less profitable than the crops which they already were growing. They declined to grow it.

A few years later, Napoleon's scientists discovered the indirect value of sugar beets when grown in rotation with cereal crops, and on March 18, 1811, the French Emperor dictated a note to his Minister of the Interior, instructing him to see that 90,000 acres of beets were planted in the different arrondissements the following season, and that the proper officials be appointed to enforce his command. He then appropriated 1,000,000 francs with which to establish schools of instruction and to be given in bonuses to those who erected factories. Although it was a new and unknown crop, the farmers were compelled to plant the beets. At the end of two years, 343 small French factories were producing 7,700,000 pounds of sugar and by 1836, the French sugar product amounted to 40,000 tons while that of Germany amounted to but 1,400 tons.

Observing that sugar beets in France revolutionized agriculture by increasing the yield of cereals to an even greater extent than had turnips in England, German economists used every effort to induce their farmers

to plant sugar beets. As they had failed to induce their farmers to grow turnips, so did they fail to induce them to grow sugar beets. Finally, they concluded to follow the French plan, and by government aid enable the factories to pay such prices for beets as would coax the farmers to increase their meager plantings. They levied a high rate of duty on imported sugar, and established a system of government bounties on sugar exports, whereby their sugar manufacturers not only were enabled to pay high prices for beets, but to sell their sugar in foreign markets at a price below the cost of production and still make a handsome profit. Immediately, the German sugar industry began to expand and other European nations adopted similar fiscal systems concerning their sugar industry, with the result that to-day one-half of the world's sugar supply is derived from European sugar beets.

When sugar-beet culture was introduced into Europe, their farmers were practicing what is known as the "three crop system" of rotation—three successive cereal crops, followed by one year of fallowing, the fallowing in order to rest the soil and to enable them to pull out the dense growth of weeds by hand. It is stated that in Germany, approximately one-third of the total area of level land was regarded as being too poor to pay for cultivation, and their yield of cereal crops on the better lands was but 12 bushels per acre.

They were plowing but three to four inches deep, using fertilizers sparingly, and the fertility of the thin layer of loose surface soil all but was exhausted. The grain roots were unable to penetrate the hard soil underneath, and could they have done so, it would have been of no avail, for, containing no humus and not having been aerated, it was not fertile. Being a deep-rooter, a prerequisite to ideal sugar-beet culture is that the soil be stirred to a depth of eight to fourteen inches.

The tender beetlet having to undergo the shock of thinning as soon as it comes up, in order to leave only one beet in a place, demanded a well-prepared, mellow seed-bed. Gathering the sugar in its leaves from the atmosphere by the aid of the light and storing it up in the root, the sugar beet would not thrive if the light were cut off through being shaded by weeds, and the eradication of the weeds before going to seed meant not only further stirring of the soil by cultivation and hoeing, but weedless fields for succeeding crops.

Being plowed out in the autumn gave an extra fall plowing, which left the land in condition to absorb instead of shed the fall and winter rains, storing up the moisture for the following season's crops.

With the removal of the main root, myriads of fibrous roots were broken off and left in the soil to an estimated average of a ton to the acre, and in rotting, they not only deposited humus in the lower strata of the soil, but they left minute channels through which it became aerated, and hence fertile. The roots of subsequent crops followed these interstices and drew nutriment from two and three times the depth of soil formerly reached, and hence the farmers doubled or trebled their soil without increasing their acreage.

Utilizing the by-products for stock feeding purposes greatly increased the stock-carrying capacity of the farms, thereby furnishing a proportionate increase in the quantity of barn-yard manure with which to build up the productivity of the worn out soil. Although many American farmers still fail to recognize the value of barn-yard manure and consider it a nuisance, inasmuch as the accumulations must be removed, scientists yet have to discover its equal as a fertilizer. The application of this increased quantity of the best fertilizer known and of other fertilizers, not only resulted in a greatly increased tonnage of beets, but as the beets absorbed only a portion of the fertilizing elements, the balance was available for the crops which followed during the succeeding three years.

The reason why the culture of sugar beets improves the soil to a greater extent than does the culture of other root crops is because their culture insures more liberal fertilization, deeper plowing and better cultivation than ordinarily is given to other root crops and because of the greater amount of fibrous roots which are left in the ground.

Farmers will engage in sugar-beet culture in preference to the culture of other root crops because it is a cash money crop, while other root crops only can be fed to stock, and because after having been sold for the sugar contained in the beets, farmers haul back to their farms the by-products which contain all the elements extracted from the soil, and the feeding value is but slightly diminished by the extraction of the sugar.

The culture of sugar-beets in Europe taught them the advantage of having a hoed root crop in the rotation, and now in the districts where there are no sugar factories, they raise sugar beets, mangolds, swedes and turnips for stock-feeding purposes, as do also the British farmers, but American farmers can not be induced to grow a hoed root crop, except where a sugar factory is at hand to contract for the product at a high price.

As a result of sugar-beet culture, the areas of Europe which formerly were regarded as worthless have been brought under cultivation, thus greatly increasing the cultivated area, the three-crop system of rotation with one year of fallow has disappeared, and the fields now yield four crops in four years instead of three crops in four years.

Where formerly only the better lands would yield 12 bushels of cereals three years in four, or 9 bushels yearly per acre, now with all the poor land added to the cultivated area, the worn out and the worthless soils have been so rejuvenated that the present combined average yield of wheat, rye, oats and barley in Western Europe, including the yield of the less progressive States of the south, is 27.2 bushels per acre, while in Denmark it is 36.3, in Germany 39.4, in Holland 41.9 and in Belgium 51.9 bushels, as compared to an average yield of but 21.6 bushels of the same crops from the virgin soils of the United States.

In the farming districts of the United States where sugar-beet culture has been introduced, the yield of cereal crops grown in rotation with sugar beets is greatly in excess of the yield in Western Europe, or even in Germany. In 1909, from 200,000,000 acres devoted to corn, wheat, rye, oats and barley in the United States, crops were produced to the value of $3,000,000,000. Had this area produced as many bushels per acre of each crop as were produced in rotation with sugar beets by the sugar-beet farmers reporting to me, at the same price per bushel their yield would have returned them $6,900,000,000, an increase of $3,900,000,000. That American farmers generally can and will secure such yields if the beet-sugar industry spreads, is certain, and the inevitable result will be a lowering of prices of food commodities, thus dividing the advantage between producers and consumers and materially reducing the high cost of living.

It cost Germany and other European countries large sums of money to develop their indigenous sugar industry, but their extra production of grain and stock and the consequent influence on the price of meats and dairy and cereal products has repaid them many times over.

From 1840 to 1903, when European export bounties were abolished under the terms of the Brussels Convention which was brought about by Great Britain, the German Government paid its sugar manufacturers $351,000,000 in export bounties, and so well satisfied were they with the results obtained, that the figures were published in chart form, bearing the legend "Please Hang in a Conspicuous Place," and sent broadcast through the Empire. During a period of 63 years it perhaps has cost the German people as much in protective duties as it cost in export bounties, a total of say $700,000,000, but this entire amount is more than repaid each year in the increase of cereals and live stock.

Since adopting this fiscal policy, Germany has produced 54,000,000 tons of sugar, valued at $4,720,000,000, of which there has been exported 26,000,000 tons which has drawn from the balance of the world $2,500,000,000, and Germany now exports sugar to the value of $50,000,000 a year. Having become the greatest sugar producer of the world, Germany, more than any other country, dominates the world price of sugar. The result of European beet-sugar production which, as stated before, now constitutes one-half of the world's supply, has so lowered the price of sugar that based on Magdeburg quotations, the present annual sugar requirements of the German Empire, cost the German people $200,000,000 less than the same amount of sugar could have been purchased for in 1855, thus constituting a saving which in itself repays every four years the entire expense of establishing the industry.

The results of the opposite agrarian policies which have been in constant operation in Germany and Great Britain during the past three quarters of a century are worthy of consideration by the American people, who consume one-fifth of all the sugar produced in the world.

About the time that Germany began to foster her beet sugar industry, Great Britain was in the throes of debate concerning the abolition of the duties on imports of cereal crops and the adoption of Cobden's free trade policy. At Manchester, in October, 1843, at a public meeting called for the purpose of expounding his theories to the people, Mr. Cobden said:

"I have never been one who believed that the repeal of the corn laws would throw an acre of land out of cultivation. * * * Our object is not to diminish the demand for labor in the agricultural districts, but I verily believe, if the principles of free trade were fairly carried out, they would give just as much stimulus to the demand for labor in the agricultural as in the manufacturing districts."

Five years later, Cobden's theory was adopted and the "corn laws" were abolished. Grain, vegetables, meat and other farm products were transferred from the dutiable to the free list and the British free trade policy was inaugurated.

But Cobden did not prove to be a prophet. In 1841, of the 16,000,000 people of England and Wales, 2,333,000 were engaged in agricultural pursuits, while in 1901, of their 32,500,000 people, but 998,000 were engaged in agricultural pursuits. During the past thirty years, 3,000,000 acres of land have been withdrawn from tillage to cereal crops and laid down to grass, and during the same period, land values, which have doubled and even quadrupled in Germany, have decreased $5,000,000,000 in the United Kingdom, as stated by R. H. Inglis Palgrave, F. R. S., in the Journal of the Royal Statistical Society for March, 1905:

"I have now to sum up the total loss of agriculture during the last 30 years, and will begin with the loss in the capital value. With respect to this, the final report of the commission on agriculture, printed in 1898, records a decline of nearly £1,000,000,000 sterling in the capital value of land in the United Kingdom as having occurred between 1875 and 1894."

While Germany has extended her tilled area and has increased the yield per acre 80 per cent in 30 years, Mr. Palgrave gives the loss in value of crops produced in the United Kingdom during 30 years as $8,000,000,000. He says:

"We have now to attempt to sum up the drop in the value of agricultural produce in the United Kingdom from 1877 onward. I have endeavored to estimate it, as mentioned above, by taking the difference between the value of the produce each year from 1878 onward, and the amount of £255,000,000 estimated by Mr. Turnbull as the average value from 1872 to 1877. This difference is shown in column 3 of Table 1. It amounts in all to £1,647,500,000."

Meanwhile, not having built up a domestic sugar industry, Great Britain has continued to import sugar, largely from Germany, which country, with its export bounties, was able to and glad to sell her surplus sugar at a price below the cost of production, because of the beneficent effect of beet culture on the yield of other crops. While Germany produced nearly $5,000,000,000 worth of sugar from 1840 to 1909, from 1846 to date Great Britain has imported $5,200,000,000 worth of sugar, a large portion of it coming from Germany, and she now imports sugar to the value of $120,000,000 a year, although producing experimentally, richer beets and more beets to the acre than are produced in Germany.

Eliminating the taxation for revenue purposes in both countries, the German people procure their sugar at the cost of German production, plus a profit to German manufacturers, plus a brokerage to German brokers, while the people of the United Kingdom pay the German sugar manufacturers the cost of production, plus the German manufacturers' profit, plus German freight to the seaboard, plus German brokerage, plus ocean freight, plus insurance, plus brokerage in the United Kingdom.

That Great Britain is beginning to see the folly of her course, is indicated by the fact that the acreage has been secured, and a beet sugar factory is nearing completion near Yarmouth which will begin making sugar in a few months.

With the marked contrast between the results obtained by these diametrically opposite fiscal policies which have been in uninterrupted operation for 60 years, it ought not to be difficult to determine which course the United States should adopt—whether it should reduce or eliminate the duty on foreign sugar imports, as demanded by the New York sugar refiners, and thereby stop the development of and completely ruin the refiners' only competitor, the domestic beet-sugar industry, or whether it should maintain and perhaps even raise the sugar duties and thus hasten the day when, instead of the people of foreign lands, American farmers and wage earners will receive not only the $100,000,000 now annually sent abroad for the purchase of sugar, but the additional hundreds of millions of dollars' worth of extra yields of other crops which would be produced as a result of the further expansion of sugar beet acreage.

Washington, D. C., July, 1912.

EXTRACT FROM SPEECH OF HON. HENRY CABOT LODGE, OF MASSACHUSETTS.

[In the Senate of the United States, July 27, 1912.]

The Senate, as in Committee of the Whole, having under consideration the bill (H. R. 21213) to amend an act entitled "An act to provide revenue, equalize duties, and encourage the industries of the United States, and for other purposes," approved August 5, 1909—

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Therefore, in considering the question of the sugar duties, the first thing to be remembered is that the well-considered opinion of the entire world holds that it is important for a nation to be independent in the production of sugar, and yet it is only of late years that the United States, although its policy for a hundred years has been protective, has really adopted this principle in regard to sugar. During most of our history we have been dependent upon the West Indies for our supply, and it was not until the production of beet sugar began in this country that we realized that we were able to make ourselves entirely independent of the rest of the world in regard to sugar, if we would only give a reasonable protection by import duties sufficient to enable the beet-sugar industry to develop. That industry since its inception has made great strides, although it has been hindered in its progress by the constant threats of adverse legislation. There is no reasonable doubt that if the industry could be assured of sufficient protection for ten years the Nation would be entirely independent of the rest of the world for its sugar supply. These views, which the rest of the world have adopted, have been totally disregarded by the makers of the House bill. Under their scheme of free sugar the Louisiana cane and the American beet sugar would go out of existence, and the supply of tropical cane from Porto Rico, the Philippines, and Hawaii, while it might in part maintain a precarious existence, would be so trifling, compared to the total amount of our consumption, that we should be left dependent upon foreign nations for this great necessity of life.

I now come to the attitude of the world in regard to a tax on sugar as a means of raising revenue. Every civilized nation to-day imposes a tax on sugar. Europe derives over $200,000,000 in revenue from its taxes on sugar, and the United States collects over $50,000,000 from the same source. This fact alone shows that the opinion of the civilized world, without any reference to the question of encouraging or building up the industry, is in favor of raising revenue from sugar. The reason for this is obvious. The tax is easily and surely collected. Although so enormously productive, it is not, except in the case of one or two European countries, a heavy tax. It falls lightly on the people who pay it. It also, as nearly as possible with an indirect tax, distributes itself fairly, according to the paying capacity of the population. Those best able to pay, pay most, because they are the principal purchasers of the many articles of luxury into the composition of which sugar enters. The rich and well-to-do households, moreover, consume naturally more sugar than the poorer ones.

Contrary to the general view of all economists and of all civilized nations, the House of Representatives has thought it judicious to take sugar from the list as a revenue producer. They could not have been moved to this action by any idea that sugar bore an unusually heavy burden in this country, because with the exception of England and Denmark the duty or tax on sugar is less here than in any other beet-sugar country in the world.

The theory of the proponents of free sugar as embodied in the House bill, if they had a theory extending beyond the collection of votes, would appear to have been that if the sugar duty was removed the entire benefit of the removal would come to the consumer and that he would receive his sugar, as I have seen it broadly and generously put, 2 cents less per pound than he now pays for it, and that the consumption per capita in the United States being 82 pounds, he would save $1.64 per year. If all the sugar brought into this country came in at 96° and paid 1.68 cents per pound, and each consumer consumed 82 pounds, he would save $1.3776 per year, so that we see at once that we have to abandon the attractive round number of 2 cents and come down from $1.64 to $1.37 as the annual saving, even on the face of the figures. But the proposition has other defects. The average consumption per capita in this country is not 82 pounds per year. According to the report of the Bureau of Labor the yearly consumption per capita is 53.7 pounds, the rest of the sugar consumed in this country being used in the manufacture of confectionery, condensed milk, chewing gum, bread, and other articles, the retail prices of which are not affected materially, if at all, by the price of sugar. Thus, taking the figures of the Bureau of Labor as correct, and my own personal investigation made before I knew them confirms the official statistics, we find that if the whole duty on 96° sugar of 1.68 cents per pound is removed each consumer will save 0.90216 cents per year.

Now, let us take the other factor of the saving. The average duty paid on sugar is not 1.68 cents, but 1.40 cents, as I have just shown, therefore the annual saving to the consumer, if the whole amount of the duty

when removed went into his pocket, would be only 72½ cents. I will print here, with the permission of the Senate, a table giving the exact annual saving per capita for each tenth of a cent reduction, assuming that the entire duty removed goes direct to the consumer and for purposes of comparison I put beside this table the figures showing the per capita loss of revenue by each tenth of a cent reduction in the duty, the net saving per capita and the total loss in national revenue:

	Annual gross saving per capita.	Annual loss in revenue per capita.	Net annual saving per capita.	Total annual loss in revenue.
By a reduction of—	*Cents.*	*Cents.*	*Cents.*	
One-tenth of 1 cent per pound	5.37	4.33	1.04	$3,899,932
Two-tenths of 1 cent per pound	10.74	8.66	2.08	7,799,864
Three-tenths of 1 cent per pound	16.11	12.99	3.12	11,699,796
Four-tenths of 1 cent per pound	21.48	17.33	4.15	15,599,728
Five-tenths of 1 cent per pound	26.85	21.66	5.19	19,499,660
Six-tenths of 1 cent per pound	32.22	25.99	6.23	23,399,592
Seven-tenths of 1 cent per pound	37.59	30.33	7.26	27,299,524
Eight-tenths of 1 cent per pound	42.96	34.66	8.30	31,199,456
Nine-tenths of 1 cent per pound	48.33	38.99	9.34	35,099,388
1 cent per pound	53.70	43.33	10.37	38,999,323
By free sugar	72.28	58.33	13.95	52,496,559

I desire now to examine more closely the prospect which the consumer would possess of receiving this benefit of 75 cents a year. In the first place, we should remember that sugar has not been involved in the general advance of the prices of the necessities of life which has attracted so much attention and has become a question of so much gravity throughout the world.

In the lower part of table No. 7 hanging next the door, there is shown graphically from the figures of the Bureau of Labor and Statistics the increase in price of articles of daily consumption, of the necessaries of life, such as articles of food. The figures above the line at the bottom of the sheet represent the increases, running up to the highest, which is in pork products. The decreases are below the line. The first and largest decrease is in molasses, the next is in California raisins, and the third is in sugar. Those are the only articles that have decreased during the three decades from 1880 to 1910.

There can be no complaint, therefore, of high prices in the case of sugar, and when the special committee, of which I was chairman, was examining into the question of wages and prices a few years ago it was found necessary to explain the fact that sugar had been falling while all other necessities of life had been rising. The explanation, of course, was that the supply of sugar outran the consumption, taking it over a considerable period of time. Even when there had been a shortage and a temporary rise in price, the rise had not been enduring and the average price, taken by years or by decades, had been steadily downward. It can not be doubted that one reason for this decline is to be found in the development of the domestic sugar industry of the continental United States, which has reached some 900,000 tons, a very important addition to the world's supply.

Now let us see whether the American consumer has suffered in comparison with other countries. Early in July, 1911, the wholesale price of refined sugar in New York was 4.9 cents per pound, or 5.69 cents retail if we add to the wholesale price the 79 cents per 100 which was charged in New York for profit and cost of distribution during a period of 17 years, as shown by the Bureau of Labor. At the same time European retail prices of granulated as gathered by the State Department were as follows:

Hamburg, 5.9; Warsaw, 7.2; Vienna, 6.5; Paris, 5.9; Brussels, 5.4; Amsterdam, 8.7; Rome, 14; Stockholm, 8; Copenhagen, 5; Madrid, 12.2; Bucharest, 10.1; Belgrade, 8.7; Sofia, 7.2; Zurich, 5.1; Athens, 11.4; Christiania, 6.3; Finland, 8.9; Lisbon, 10.3; Constantinople, 5.1; London, 5.

It will thus be seen that sugar was cheaper in the United States than in the majority of the great European sugar markets. The difference between even London, the lowest, and the United States was comparatively very small—only 69 cents on 100 pounds. I ought to say that the figures for July, 1911, were taken before the great rise in prices, occasioned by the shortage in the world's sugar crop which developed later in that year. The average retail price of sugar in the United States from 1890 to 1907 was only 5.7 per pound, and the average price has been lower rather than higher since then. That which has kept the American sugar prices at this low level has been the home production—the cane sugar of Louisiana and the beet sugar of the West.

Who, then, in the United States, is seeking as a matter of personal interest to bring about the results which I have tried to portray? I mean what are the forces outside of Congress which are pressing for free sugar or for a heavy reduction in the rates? Certainly neither consumers, who are conscious of no rise in sugar prices, nor sugar growers, who naturally are not laboring for their own ruin. So far as I have been able to learn the movement for free sugar, outside of Congress, has come from two of the three great sugar refineries of the country, and from that source alone. We are accustomed when speaking of the "Sugar Trust" to mean thereby the American Sugar Refining Co., and for many years that company, having absorbed most of the lesser refineries, was fitly described by that phrase. Since those days of absorption there have grown up, however, two other refineries, those owned by the Arbuckles and the Federal Co., belonging to the Spreckles interests. These independent refineries differ in no respect from the American Sugar Refining Co. except that they are perhaps not so large. Although all three are rivals, their general and essential interests are the same. The American Sugar Refining Co. has not appeared in this campaign for free sugar, but the Arbuckles have warmly advocated free sugar, and the Federal Co. has spent money, employed agents and lobbyists, distributed broadcast throughout the country circulars filled with statements more or less false, and has urged the removal of the duties on sugar. It is therefore not amiss to consider briefly what the purposes of these philanthropists may be in seeking unselfishly and at much expense to benefit, as they assert, the people of the United States by giving them sugar free of duty.

The interest of the American sugar refiners in maintaining a tariff on sugar is confined to the difference between the duty maintained on imports of raw sugar—their raw material—and the duty maintained on refined sugar—their finished product; in other words, that portion of the duty known as the "refiners' differential." The refiners say that owing to the increased volume of business which would be brought about by lowering the price of sugar they gladly would give up their differential if they could but import their raw sugar free of duty. But this is not the whole story, and this consideration is not in itself of sufficient importance to account for the strenuous war which the refiners of the Federal Co. are making on the present sugar tariff. Their assertion that they are actuated by philanthropic motives and a desire to give the people cheaper sugar can be disposed of by a brief account of their methods of business during the past year.

In the summer of 1911 it became apparent that there would be a shortage in the world's sugar crop, and although, according to the records of the United States Treasury Department, American refiners were paying no more or but little more for raw sugar, the American Sugar Refining Co. advanced the price of refined sugar from $4.90 in July to $6.50 in October, the Federal Sugar Refining Co. increased it to $7.25, and Arbuckle Bros. to $7.50. Only in October, when the domestic beet sugar came into the market at $6.50, did these refiners lower their prices in order not to retire from the market. By December the price had receded to $5.53, and Mr. Wallace P. Willett, the sugar expert of Willett & Gray, stated that but for the marketing of this domestic beet-sugar product the price of sugar in America would have gone higher than any other price we have seen. Mr. Willett said to the Hardwick committee:

> The moment our American beet-sugar production became available on the market the rise stopped, and, owing entirely and totally to this American production, refined sugars were a cent and a half lower than they were at the highest point. But for that American production we to-day would be buying sugar at the world's prices. (Pt. 37, p. 3084, of hearings.)

Until the domestic crop of beet sugar invaded the market, the refiners had a monopoly and fixed the price of their product at will. To what figure they would have increased the price of their product and the extra millions they would have made at the expense of the people had not the new crop of beet sugar broken their monopoly, it is impossible to say. It also is impossible to say how many extra millions the Federal, the Arbuckles, and other self-styled philanthropic sugar refiners realized before the marketing of domestic sugar interfered with their plans, but the annual statement of the American Sugar Refining Co. shows that their profits rose from $6,380,302 in 1910, to $14,083,054 in 1911, an increase of nearly $8,000,000, which would not seem to indicate that philanthropy is their sole purpose.

To stop first the growth of and then destroy the present domestic beet-sugar industry, is the real purpose of the refiners whether active or passive. The beet-sugar industry produces refined sugar for direct consumption, and therefore the volume of business of the sugar refiners necessarily is curtailed in proportion to the amount of domestic beet sugar produced. This domestic product has increased from 32,000 tons in 1898, to 600,000 tons in 1911–12, which means that the present output of the refiners is 600,000 tons per annum less than it would be if the domestic beet-sugar industry did not exist. But this growth of 1,800 per cent in 13 years is only the

beginning. If left to develop under present conditions, unhindered by constant tariff agitation, our domestic sugar industry soon will supply us with all the $100,000,000 worth of sugar we now import from foreign countries. This is what the refiners see and fear. They fear it, because aside from a small quantity of maple and Louisiana raw, of all the sugar we consume, about one-fifth of all the sugar produced in the world, this domestic beet sugar is the only sugar which does not pass through the hands of the refiners and yield them a profit. For every ton of beet sugar produced for direct consumption, one ton less of imported raw sugar will pass through and pay tribute to the American refineries. A domestic product of thirty to forty thousand tons of refined beet sugar did not arouse the opposition of the refiners, but with an increase of 1,800 per cent in thirteen years the refiners realize that if the tariff on sugar be not disturbed, the domestic product will supplant all the foreign sugar we now consume and for which we pay other countries $100,000,000 a year.

The refiners state that what they desire is free raw sugar, and they acknowledge that in their judgment free raw sugar would ruin the home producing industry. If they can not get free raw sugar, they want such a material reduction in the raw sugar duty as would crush the domestic industry, and do it just as surely as would free raw sugar. But failing to secure either free raw sugar or a material reduction in the duty thereon they desire some reduction, be it ever so small, for while a slight cut might not close our present beet-sugar factories it would discourage new capital from embarking in the industry. A slight reduction would accomplish this important purpose of the refiners almost as surely as would a great reduction.

Last year, according to their published statement, the profits of the American Sugar Refining Co. amounted to 45.7 cents per hundred pounds of sugar refined. It might be fair to assume that the net profit of operation in refining sugar averages 25 cents per hundred, and the profit on manipulation a like amount, but assuming that the total profits amount to only 25 cents per hundred, the present domestic beet-sugar product of 600,000 tons reduces the refiners' profits by $3,000,000 a year, inasmuch as were it not for the domestic industry there would be 600,000 more tons of foreign sugar to be refined. Furthermore, as the present capacity of American refiners is one-third greater than their meltings, they would add this $3,000,000 a year net profits without having to increase their plant investment and without increasing their margin between raw and refined sugar. In addition to this, there is the constant menace of further expansion of the domestic industry under present tariff conditions.

Our imports of foreign sugar last year amounted to 1,800,000 short tons, and if this also were produced at home the refiners' profits would be curtailed to the extent of $9,000,000 more. The overhead charges of the refiners are the same as though they were running to full capacity, and it follows that if the domestic beet-sugar industry be expanded and the refining industry curtailed the expense of refining will be increased, and if the domestic industry be destroyed and the volume of the refiners' business thereby be increased by 600,000 tons, the expense per hundred pounds on their entire output would be materially reduced. But avoiding an additional loss of $9,000,000 a year through the further expansion of the domestic beet-sugar industry and adding $3,000,000 a year to their profits through crushing the present industry, constitute only a portion of the profits which would accrue to the sugar refiners through placing raw sugar on the free list. With domestic competition destroyed, the refiners, unhindered, could and would increase the margin between raw and refined sugar, and an increase of 45 cents per hundred, such as they made under free raw sugar, would give them on our present consumption of 3,350,000 long tons an extra $33,500,000 profit annually.

A difference of half a cent a pound might not be noticed by the average consumer, but an increase of that amount in the margin between raw and refined sugar means many millions to the refiners, as I will show.

In 1887, 18 of the 21 American refineries were merged into what was known as the Sugar Trust and capitalized at $50,000,000. The New York courts enjoined the Sugar Trust from doing business in the State, and in January, 1891, its successor, the present American Sugar Refining Co. of New Jersey, was formed with $25,000,000 preferred and $25,000,000 common stock. During the evolution from trust to refining company raw sugar was placed on the free list and a bounty was provided for sugar of domestic production. Under this free raw-sugar bill of 1890 the refiners were able to increase the difference in price between raw and refined from 70 cents a hundred in 1890 to $1.15 per hundred in 1893, an advance of 45 cents per hundred, while the American Sugar Refining Co. increased its capital stock to $75,000,000, half common and half preferred. The increase in the margin between raw and refined sugar was reflected in the dividends paid on the common stock of the American Sugar Refining Co., which rose from 4 per cent in 1891 on $25,000,000 to 21½ per cent in 1893 on $37,500,000, their total annual dividend payments increasing from $2,750,000 in 1891, to $10,687,500 in

1893, a net increase of $7,937,500. During the four years, 1890 to 1894, the total amount paid out in dividends by this one company amounted to $27,125,000. This is what free raw sugar did for the refiners' stockholders in four years. Then followed an ad valorem sugar tariff, and during the seven years of free sugar and 40 per cent ad valorem (Oct., 1890–July, 1897) the American Sugar Refining Co. paid out $48,500,000 in dividends. In addition to this, their annual statement of December 31, 1897, shows that they had $25,000,000 in cash and bills receivable on hand, $22,500,000 worth of sugar, and $30,000,000 invested in other companies, a total accumulation of undistributed profits amounting to $78,000,000, with debts of $30,000,000, or a net surplus of nearly $50,000,000, in addition to the distribution of a like amount in dividends during this seven-year period. On the basis of the duties levied in 1897, the loss to the Federal Treasury in sugar duties from October 1890, to August, 1894, amounted to over $240,000,000, and I have shown where 40 per cent of it went. In 1897 a duty of $1.685 was placed on 96° raw sugar to protect and build up a domestic sugar industry and for the protection of the refineries the duty on refined was fixed at $1.95. As a result of this legislation, while the refiners have not reaped such inordinate profits as they did under free sugar, they have prospered and, as I have stated, the domestic beet-sugar crop has grown from 33,000 tons to 600,000 tons, an increase of 1,800 per cent in thirteen years.

The so-called independent refiners who are denouncing the present tariff on sugar claim that they are fighting the trust, although aside from whatever interest it may have in the domestic industry, the interests of the trust—which refines three times as much sugar as the entire domestic industry produces—are identical with all other refiners.

Eleven years ago when the domestic beet-sugar product amounted to something over 100,000 tons, the president of the American Sugar Refining Co. attempted to secure control of the domestic beet-sugar industry, for what purpose we can only surmise. He bought an interest in several companies, but death overtook him, and since that time much of this stock has been sold, and it appears that the policy of this corporation is to dispose of its remaining holdings as fast as opportunity presents.

Mr. Atkins, the present vice-president and acting president of the American Sugar Refining Co., has been largely interested in Cuban sugar estates since his youth, and he does not approve of our developing a home sugar industry which in time might compel him to seek another market for his raw sugar. Mr. Atkins was a director of the American Sugar Refining Co. at the time its president proposed to secure an interest in some of the American beet-sugar companies, and he declared he opposed the policy from the outset. When before the Hardwick committee last year he gave the following as his reason for objecting (pt. 1, pp. 85–86 of the Hearings):

> The beet-sugar business was a competitive business. It produced in the Western Territories, where our market lay. I say, "our market"—I mean the market of the refiners, the various refiners. As that industry grew—and I foresaw that it would grow rapidly—I believed that it would reduce the volume of business, not only of the American Sugar Refining Co., but of all the refiners on the Atlantic coast; and although we had millions of dollars invested in the business there, we were building up a competitive business, one that would compete with ourselves, and one which was bound to get away from us; we could not control it in the end. I say "we"—I had no connection with it; that was simply a business man's opinion.

As to the effect which the marketing of the 1911 crop of 600,000 tons of domestic beet sugar had on the price of sugar and on the refining industry, Mr. Atkins told the Hardwick committee (Hearings, pt. 1, p. 49):

> All that beet sugar comes on the market at a certain season of the year. It is all produced in about three months' time. They all want to market it just as rapidly as possible, and in order to do that they come to the eastern points. California sugar comes into Chicago and the Michigan sugar into Buffalo and Pittsburg, and eastern Refineries—not only the American Sugar Refining Co., but the others—have to reduce or close down until the beet sugars are out of the way. Any refining that is done between the first of October and the 1st of January is done without any profit, and very often at a loss.

It is a business proposition, pure and simple, and in antagonizing the interests of the domestic sugar industry and endeavoring to prevent its expansion the refiners are doing what most men would do under like circumstances, though they might not claim to be actuated by philanthropic instead of selfish motives, and they might not stoop to pose under the name of an imaginary committee of wholesale grocers.

Some advocates of free sugar assume that such action would injure the refiners, but the only action Congress could take which would be inimical to their interests would be to raise the duty on raw sugar and thus stimulate the more rapid development of the domestic industry. As to tariff agitation looking to a lowering of the duty on raw sugar, the refiners not only welcome it, but instigate and conduct it, aware that even if the duty be not touched, such agitation will prevent millions of dollars from embarking in and expanding a competitive business. A slight reduction in the tariff would discourage other millions and a material reduction or free trade in sugar would ruin the domestic industry and fortify them in their monopoly.

Grouping the several advantages which would accrue to the refiners by materially reducing the duty on raw sugar or placing it on the free list, we have the following seemingly good reasons for their activity:

(a) The construction of new beet-sugar factories would cease, thus removing their fear of losing $9,000,000 a year, which they now make on refining 1,800,000 short tons of foreign sugar.
(b) The present beet-sugar factories would close, thus increasing the volume of business of the refiners by 600,000 tons a year and increasing their annual profits by $3,000,000.
(c) As the refiners' overhead charges would not be increased by reason of the increased volume of business, the cost per 100 pounds on their entire output would be decreased.
(d) They would save the interest on the $50,000,000 they now have to pay into the customhouses in duties.
(e) The removal of their only competitor which now forces them to operate their plants at a loss or close them down for 3 months out of 12, would give them a complete monopoly and enable them to fix and maintain prices at will throughout the year.
(f) It would enable them materially to increase the margin between raw and refined sugar without increasing the price of refined.

Considering the decreased cost of production, the increased volume of business, the lowering of interest charges, and the increased margin the refiners would be able to maintain between raw and refined sugar by reason of regaining a complete monopoly of the sugar industry of the United States, it is fair to assume that a favorable outcome to the war they are waging against the domestic beet-sugar industry will add $25,000,000 to $50,000,000 a year to their net profits, and our Federal Treasury would lose $50,000,000 a year in revenue. A return to free raw sugar, a complete monopoly of the sugar business, and 21½ per cent dividends are the natural desires of the refiners. If we are to judge by the mass of free-sugar literature with which Congress and the country generally is being deluged, no one knows better than do the refiners that, however many millions they expend in their efforts, they will reap ample reward if they win. The beet and cane producing sugar industries are scattered through a large number of States and through our insular possessions. It is impossible for them to organize under one general head to maintain their position. The refining industry is operated in large units, and six men can form a cohesive body which will map out every detail of their business, from shaping tariff policies to regulating the price which 96,000,000 people shall pay for their product. It should be plain to the most simple that when the heads of an industry which turns out an annual product valued at over $300,000,000 a year attacks a competitor which forces it to run at a loss or close down for three months of the year, it is not done from philanthropic motives; and that permanently cheaper prices to the consumer are not to be secured by establishing a complete monopoly in the production of an article like sugar. As stated before, with such legislative conditions as enable American sugar refiners to purchase their raw material far below the world's price, their conditions are ideal, barring only the output of the domestic beet-sugar industry and its anticipated expansion, which can be stopped by securing even a modest reduction in the duty on raw sugar.

There seems, then, to be but one way by which the American refiners can be kept within bounds, and that is to maintain the duty on raw sugar and thus develop an independent home-producing industry which will deprive the refiners of a monopoly of the business and a consequent control of prices. That, of course, which would be best for the refiners would be a heavy reduction of the duty on all sugars, sufficient to destroy the Louisiana cane and the beet-sugar industry and at the same time secure to the refineries an unassailable position in the American market. But, although less advantageous than this situation, it would still be highly profitable to them to get rid of the domestic industries, even at the price of absolutely free sugar. Their margin of profit might be cut down by foreign competition, but the difference in ocean freights, the nearness of the Cuban sugar fields and the enormous increase of the gross sales would enable them to withstand European competition unless it was backed by bounties, which are now rendered impossible under the Brussels agreement. The control of the market of the United States from the Atlantic to the Pacific would be more than worth any sacrifice that they might be obliged to make if the refined sugars of Europe came in free. It is to be doubted, however, whether they would in reality be obliged to make any such sacrifice, for the industry is in so few hands that it would not be difficult for them to come to an agreement with the foreign syndicates.

Free sugar, therefore, and still more largely reduced duties on sugar, would be for the benefit of the American sugar refining companies and could by no possibility benefit anybody else. To give up the great domestic industry and throw away a large revenue without any sensible reduction in the price of the commodity seems a large price to pay for the purpose of increasing still further the profits of the three great refining companies of the United States.

Let me now recapitulate the propositions in regard to duties on sugar which seem to me clear:

First. That it is sound policy and has been recognized as of the highest importance for nearly one hundred years by the civilized world that a country should be at least measurably independent in regard to its supply of sugar and should have the means to furnish itself with that essential article.

Second. That it is the universal opinion of all civilized nations, of all economists, and financiers, that sugar is an eminently suitable subject for taxation, providing a large revenue easily and fairly collected, with the least possible pressure upon the individual consumer.

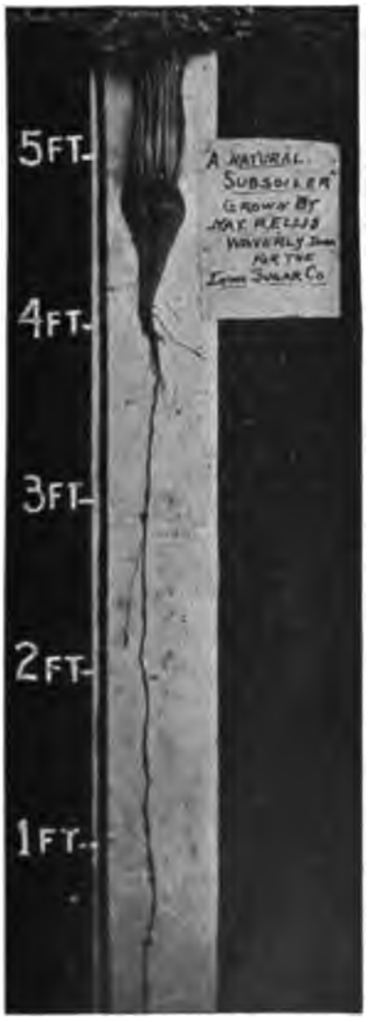
Third. That sugar is perhaps the one article of general consumption, the one great necessity of life, which has not shared in the general advance of prices which has taken place during the last fifteen years and which has been so much accelerated during the past five years.

Fourth. That the price of sugar in the United States is lower than in any other country in the world except England, Switzerland, Denmark, Belgium, and Turkey, and that the competition of the domestic industry is the principal cause of the low prices of sugar maintained within the United States.

Fifth. That the industry is of great value to the country, particularly the beet-sugar industry, which not only employs many thousands of people directly, but which is of incalculable benefit to the farmers, enhancing the value of their lands and increasing the general agricultural capacity of all those regions where the beet is raised for the purpose of making sugar.

Sixth. That the maintenance of the duties enables us to keep out the cheap surplus sugars of Russia and other countries which, if admitted free, would abnormally depress the price of sugar here and lead to the extinction of our own industry, and which at the same time would take from us the Cuban market, because we could no longer give the Cubans a preferential on their sugar. The removal of the sugar duties would also destroy to a large extent our trade with the Philippines, Porto Rico, and Hawaii, which has now reached the enormous amount of $182,000,000 a year. We sell to Cuba products to the value of $62,000,000 a year and take from her products to the value of $106,000,000 a year, of which $76,000,000 is sugar. Our total trade with the four islands amounts to $351,000,000 a year, and that trade will be very largely lost, certainly very greatly reduced, by the removal of our sugar duties. In the face of such facts as these it is difficult to characterize the folly of such legislation as is proposed by the House Bill or to portray the injury which it would bring to the people of the United States.

I believe that there should be a duty on sugar, because, as I have tried to show, it is one of the best subjects for raising revenue that modern economists and financiers have been able to devise. I believe that this duty should be sufficient also to give reasonable protection and encouragement to the production of sugar within the United States, so that we may develop a home industry capable of supplying all our needs. It seems to me clear that it is of the utmost importance to the well-being of the Nation to be independent in regard to the production of this great necessity of life. I think the duty ought to be maintained at a point under which cane sugar can be grown profitably in Louisiana and Texas and beet sugar can be made with reasonable profits throughout all the vast region adapted to the culture of the sugar beet. It seems to me that the reasons for a sufficient duty to attain these ends rest upon far broader grounds than most protective duties, strongly as I believe in the system of protection. Upon the evidence submitted to the committee and from such study as I have been able to give to the question, and from such examination of foreign and domestic authorities as I have been able to make, I am satisfied that the present rate of duty can not be materially lowered without seriously injuring the production of sugar in the continental United States. It is to that protection that we owe the very moderate prices at which sugar has been sold during many years, a price which has not shared in the advance common to almost all other articles in our food supply. I am satisfied for the reasons I have already given that the destruction of our cane and beet sugar industries in the continental United States would result not only in an advance in the cost of sugar to the American people, but would put us at the mercy of a foreign combination among the beet-sugar producers of continental Europe. If we lower the present duty below 1.68 cents, we bring the Cuban rate, which is really the rate with which our production has to compete, below 1.34 cents. If we go much below 1.34, we shall, in my opinion, destroy our cane-sugar production in Louisiana and prevent its development in Texas. If we go still further we shall arrest the development of the beet-sugar industry, and in the course of a very few years of progressive reductions we shall begin to diminish our beet-sugar production until it is finally extinguished. If we should adopt the 33 per cent reduction suggested by the Democratic minority in the Senate, we should destroy the cane-sugar and the beet-sugar production of the United States as completely, if not quite as quickly, as by the absolute abolition of duties proposed by the House.



A SUGAR BEET

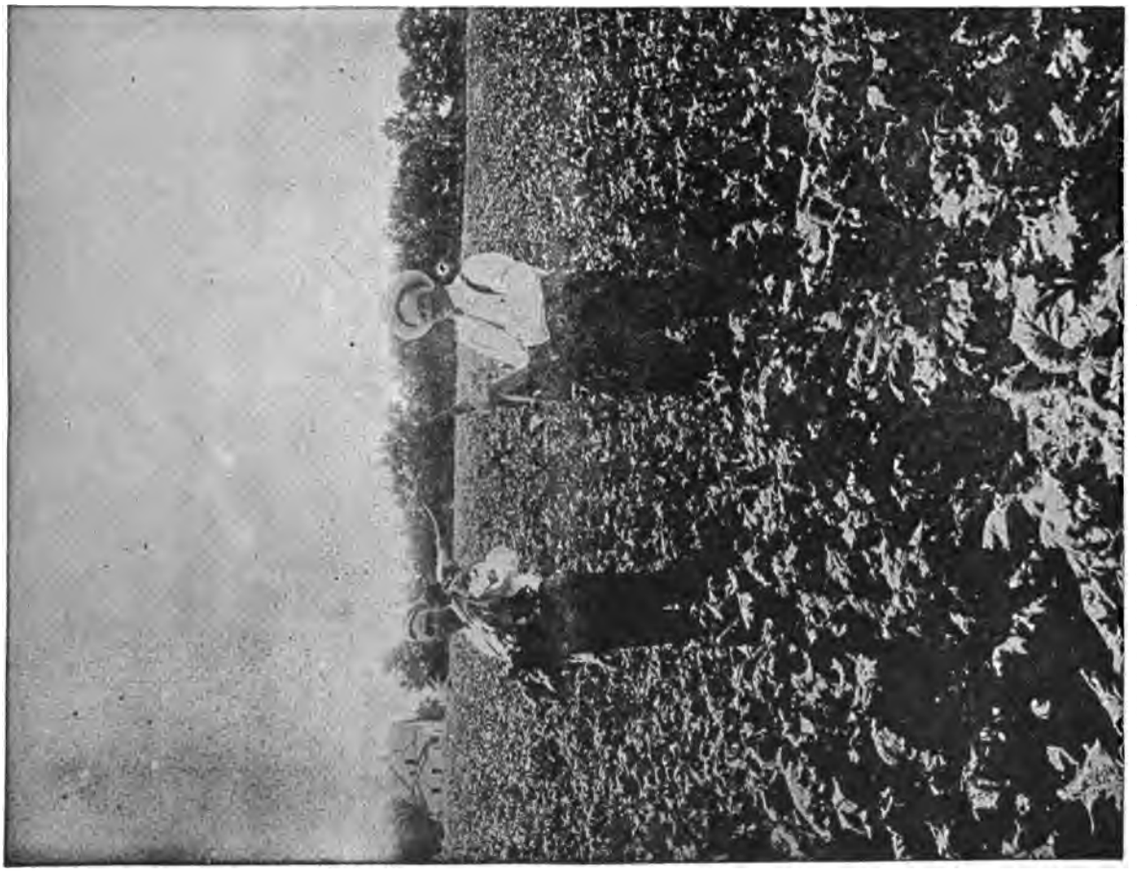
Showing the long tap-root and laterals by which it opens up new depths of fertility and improves the quality of the land.

CATERPILLAR ENGINE WITH PLOW AND HARROW PREPARING GROUND FOR SOWING OF BEETS.

PLANTING SUGAR BEETS—SOWING THE SEED.

FORTY ACRES OF SUGAR BEETS, HAMPTON, IOWA, JULY 23, 1908.

HARVESTING 80-ACRE FIELD OF BEETS RAISED BY J. C. CLARK, SCOTTSBLUFF, NEBRASKA.
Farm "P" (taken October 18, 1911.)



120-ACRE BEET FIELD UNDER WINTER'S CREEK CANAL.
(Taken August 13, 1911.)

Chart No. 1

World Production of Cane Sugar, 1910-11

8,566,814 Metric Tons.

Compiled From Figures of Willet & Gray.

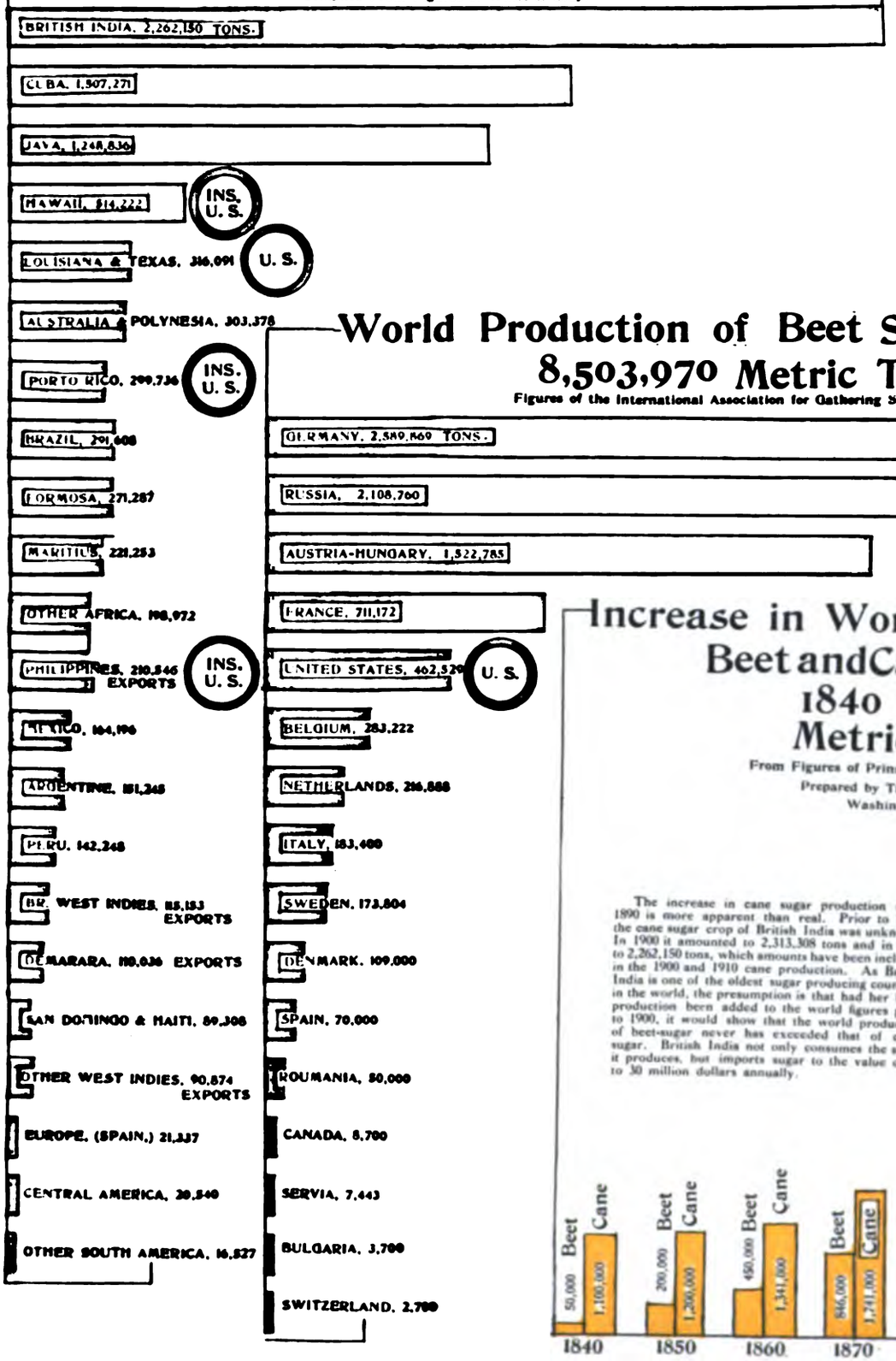


Chart No. 2

World Production of Beet Sugar, 1910-11

8,503,970 Metric Tons.

Figures of the International Association for Gathering Sugar Statistics.

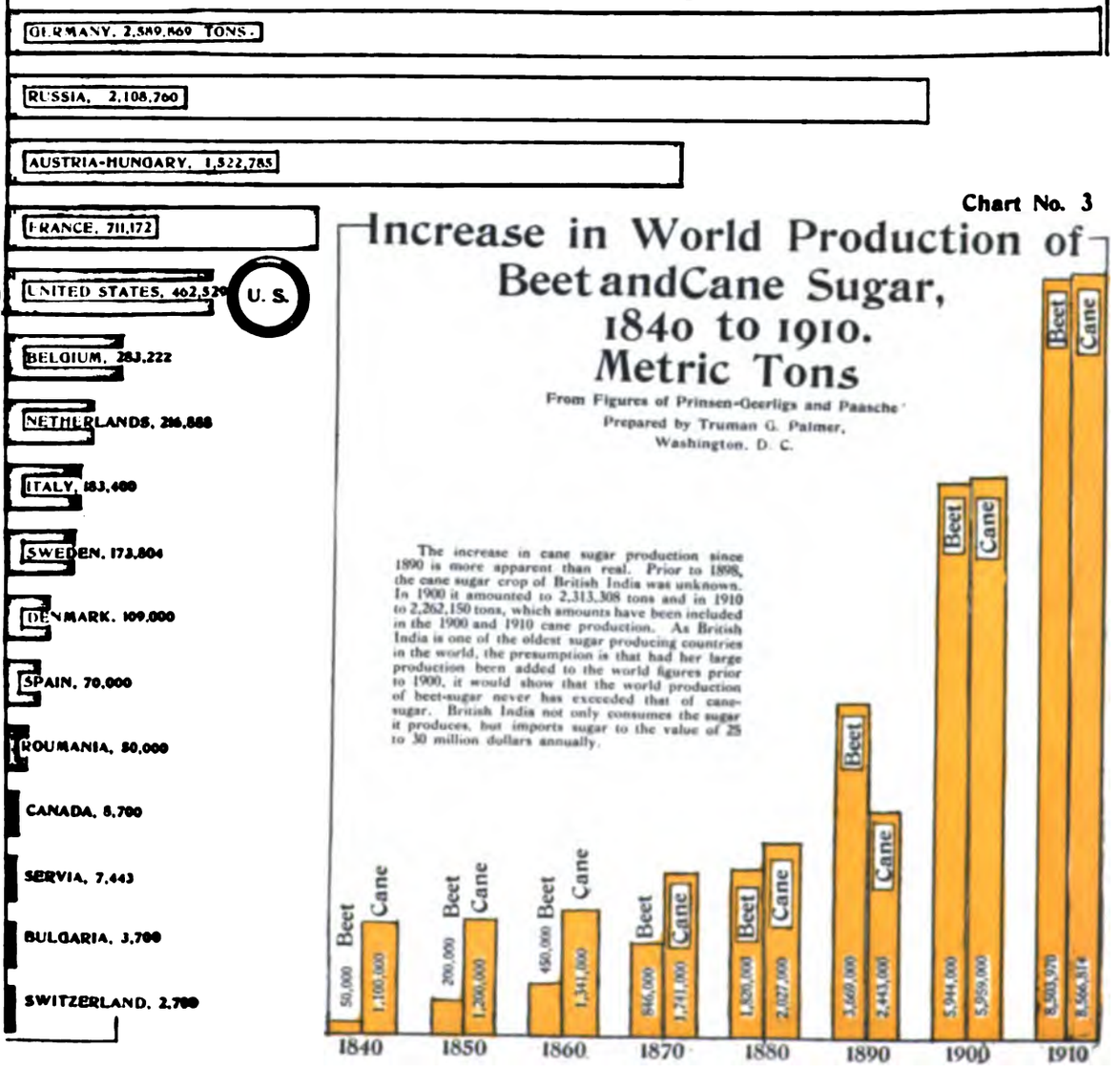


Chart No. 3

Increase in World Production of Beet and Cane Sugar, 1840 to 1910. Metric Tons

From Figures of Prinsen-Geerligs and Paasche
Prepared by Truman G. Palmer,
Washington, D. C.

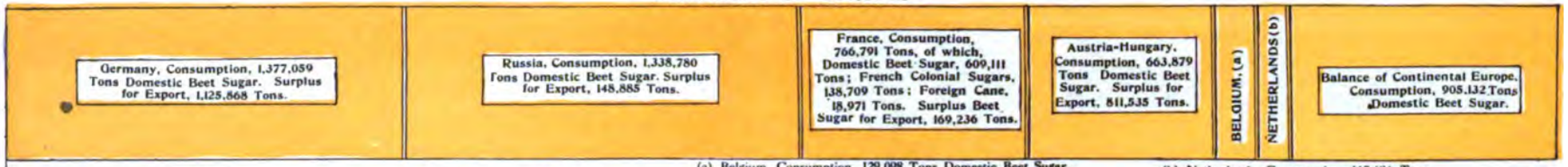
The increase in cane sugar production since 1890 is more apparent than real. Prior to 1898, the cane sugar crop of British India was unknown. In 1900 it amounted to 2,313,308 tons and in 1910 to 2,262,150 tons, which amounts have been included in the 1900 and 1910 cane production. As British India is one of the oldest sugar producing countries in the world, the presumption is that had her large production been added to the world figures prior to 1900, it would show that the world production of beet-sugar never has exceeded that of cane-sugar. British India not only consumes the sugar it produces, but imports sugar to the value of 25 to 30 million dollars annually.

Sources of European and United States Sugar Supply.

Chart No. 4

Prepared by Truman G. Palmer, From Figures of the International Association for Gathering Sugar Statistics. F. O. Licht; Willet & Gray, British Board of Trade and other Government Figures.

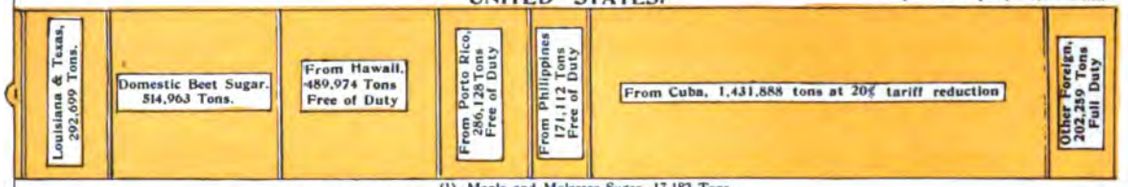
CONTINENT OF EUROPE.


Germany, Consumption, 1,377,059 Tons Domestic Beet Sugar. Surplus for Export, 1,125,868 Tons.
Russia, Consumption, 1,338,780 Tons Domestic Beet Sugar. Surplus for Export, 148,885 Tons.
France, Consumption, 766,791 Tons, of which, Domestic Beet Sugar, 609,111 Tons; French Colonial Sugars, 138,709 Tons; Foreign Cane, 18,971 Tons. Surplus Beet Sugar for Export, 169,236 Tons.
Austria-Hungary, Consumption, 663,879 Tons Domestic Beet Sugar. Surplus for Export, 811,535 Tons.
BELGIUM. (a)
NETHERLANDS (b)
Balance of Continental Europe. Consumption, 905,132 Tons Domestic Beet Sugar.

(a) Belgium, Consumption, 129,098 Tons Domestic Beet Sugar. Surplus for Export, 155,444 Tons.

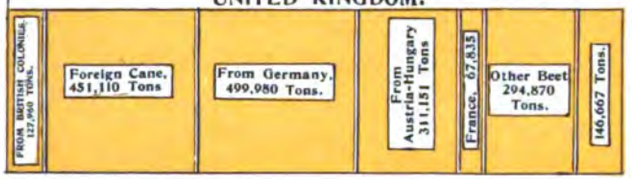
(b) Netherlands, Consumption, 112,694 Tons, of which 8,702 Tons from Java; Balance Domestic Beet Sugar. Surplus for Export, 145,724 Tons.

UNITED STATES.


Louisiana & Texas, 292,699 Tons.
Domestic Beet Sugar, 514,963 Tons.
From Hawaii, 489,974 Tons Free of Duty
From Porto Rico, 286,126 Tons Free of Duty
From Philippines 171,112 Tons Free of Duty
From Cuba, 1,431,888 tons at 20% tariff reduction
Other Foreign, 202,259 Tons Full Duty

(1) Maple and Molasses Sugar, 17,182 Tons

UNITED KINGDOM.



1910-11 WORLD SUGAR CROP:

	Metric Tons
Cane	8,566,814
Beet	8,503,970
Total	17,070,784

Sugar Consumption of the World

(In Metric Tons)

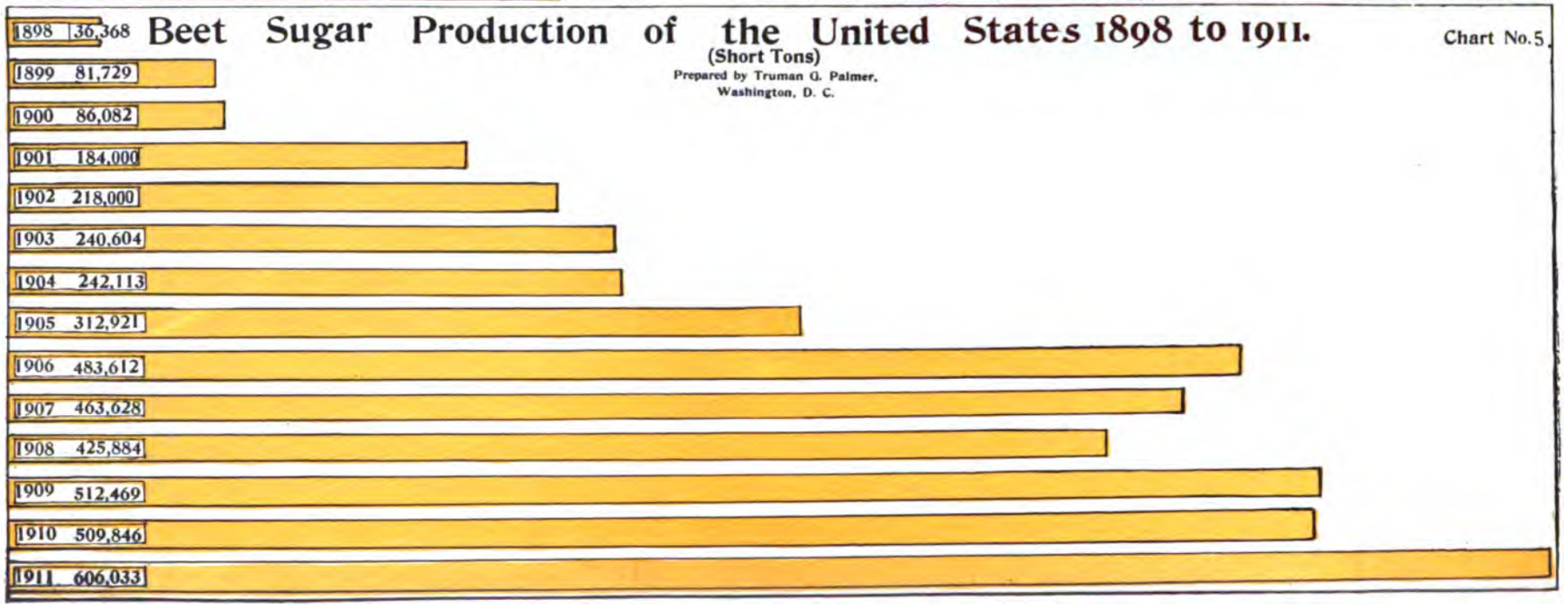
	Tons
United States, Domestic Beet, Cane and Maple	824,844
United States, Insular Cane, Free of Duty	947,214
United States, Total Domestic and Insular	1,772,058
United States, Foreign Cane and Beet	1,634,147
United States, Domestic and Foreign	3,406,205
United Kingdom	1,899,513
Continental Europe	5,300,431
British India	2,974,506
Balance of the World	3,490,129

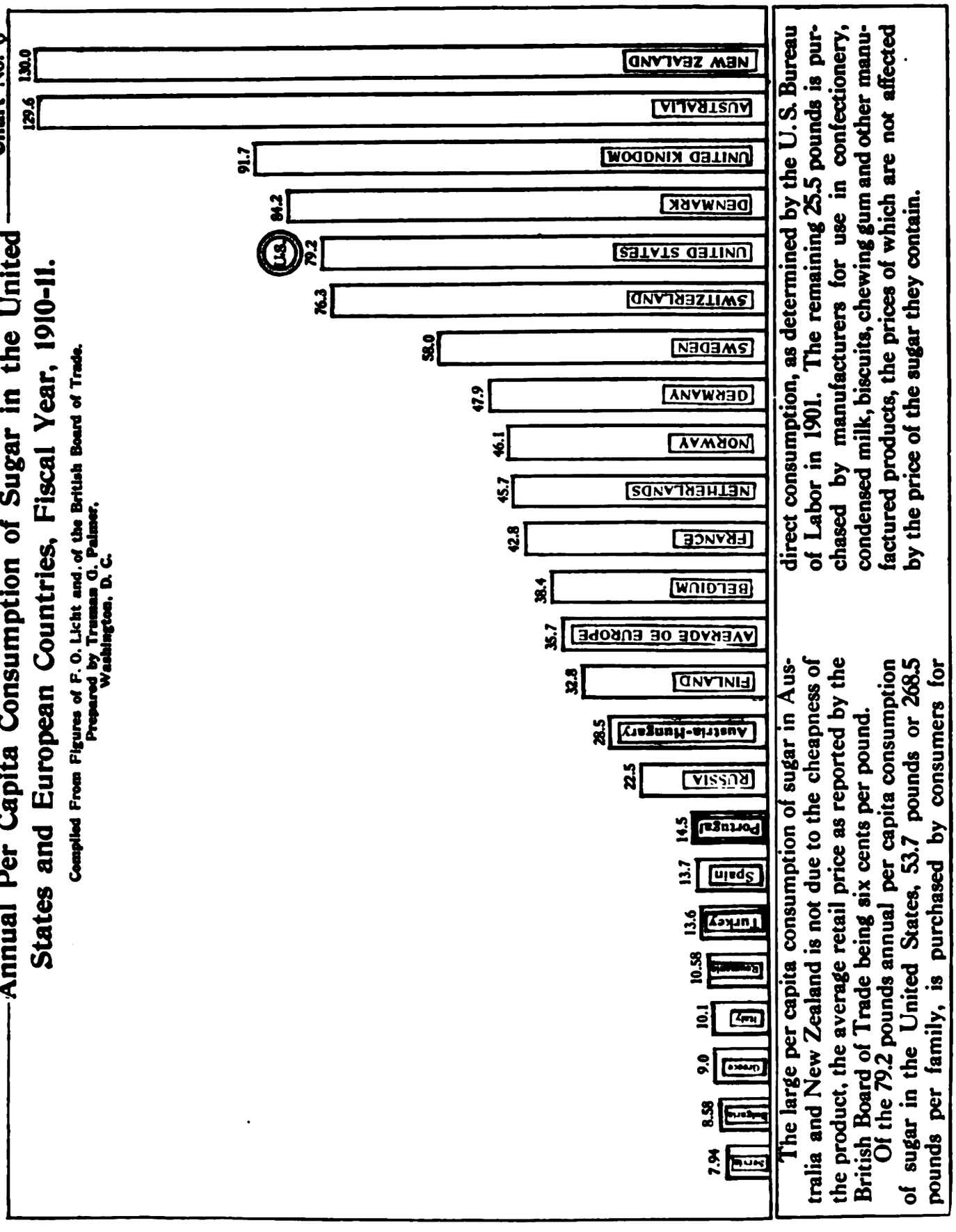
Beet Sugar Production of the United States 1898 to 1911.

Chart No. 5.

(Short Tons)

Prepared by Truman G. Palmer, Washington, D. C.





The large per capita consumption of sugar in Australia and New Zealand is not due to the cheapness of the product, the average retail price as reported by the British Board of Trade being six cents per pound.

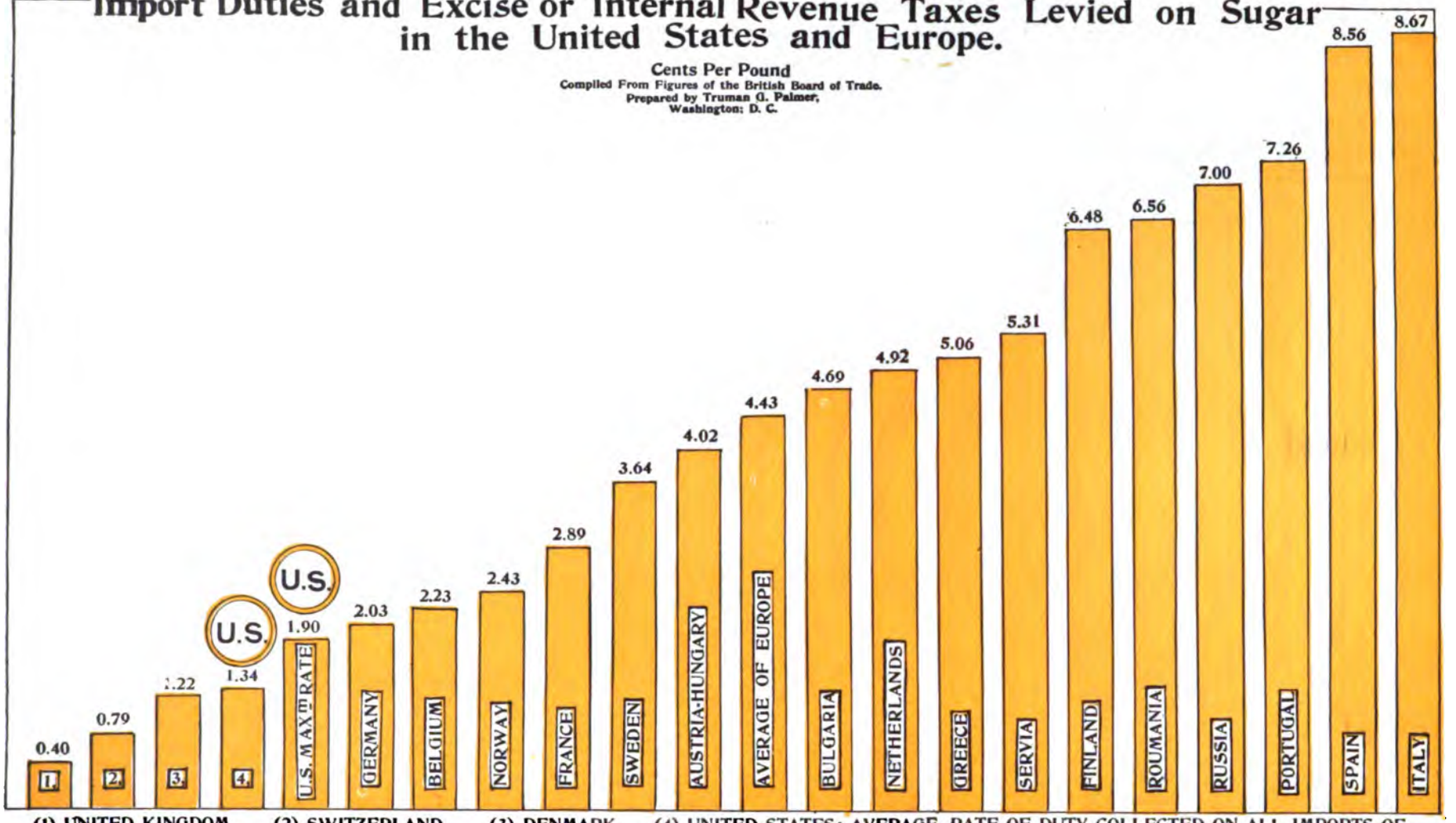
Of the 79.2 pounds annual per capita consumption of sugar in the United States, 53.7 pounds or 268.5 pounds per family, is purchased by consumers for direct consumption, as determined by the U. S. Bureau of Labor in 1901. The remaining 25.5 pounds is purchased by manufacturers for use in confectionery, condensed milk, biscuits, chewing gum and other manufactured products, the prices of which are not affected by the price of the sugar they contain.

Chart No. 7

Import Duties and Excise or Internal Revenue Taxes Levied on Sugar in the United States and Europe.

Cents Per Pound

Compiled From Figures of the British Board of Trade.
Prepared by Truman G. Palmer,
Washington, D. C.



(1) UNITED KINGDOM. (2) SWITZERLAND. (3) DENMARK. (4) UNITED STATES; AVERAGE RATE OF DUTY COLLECTED ON ALL IMPORTS OF FOREIGN SUGAR DURING CALENDAR YEAR 1911.

What Sugar Tariff Reduction Would Mean to Consumers.

From Report of Senate Committee on Finance on House Free Sugar Bill, May 17, 1912.

"There is good reason to believe that the refiners would absorb all of any small reduction which might be made, and a large portion of the remission, if sugar were placed on the free list. If, however, the full reduction of duty would be reflected in the refiners' price, in the wholesalers' price, and in the retailers' price as well, your committee feels that the saving per capita would be too infinitesimal to warrant the adoption of a measure which would discourage the further expansion of the domestic beet-sugar industry.

"To offset this slight saving which might be effected by the consumer would be the loss in national revenues which, if lost on sugar duties, must be collected from the consumer in some other form of taxation.

"Assuming, however, that the refiners would be generous enough not to increase their margin between raw and refined, but would pass the sugar over to the jobbers at a price lower by the full amount of the tariff reduction, . . . the net result to the consumer on a percentage basis of reduction would be as follows:

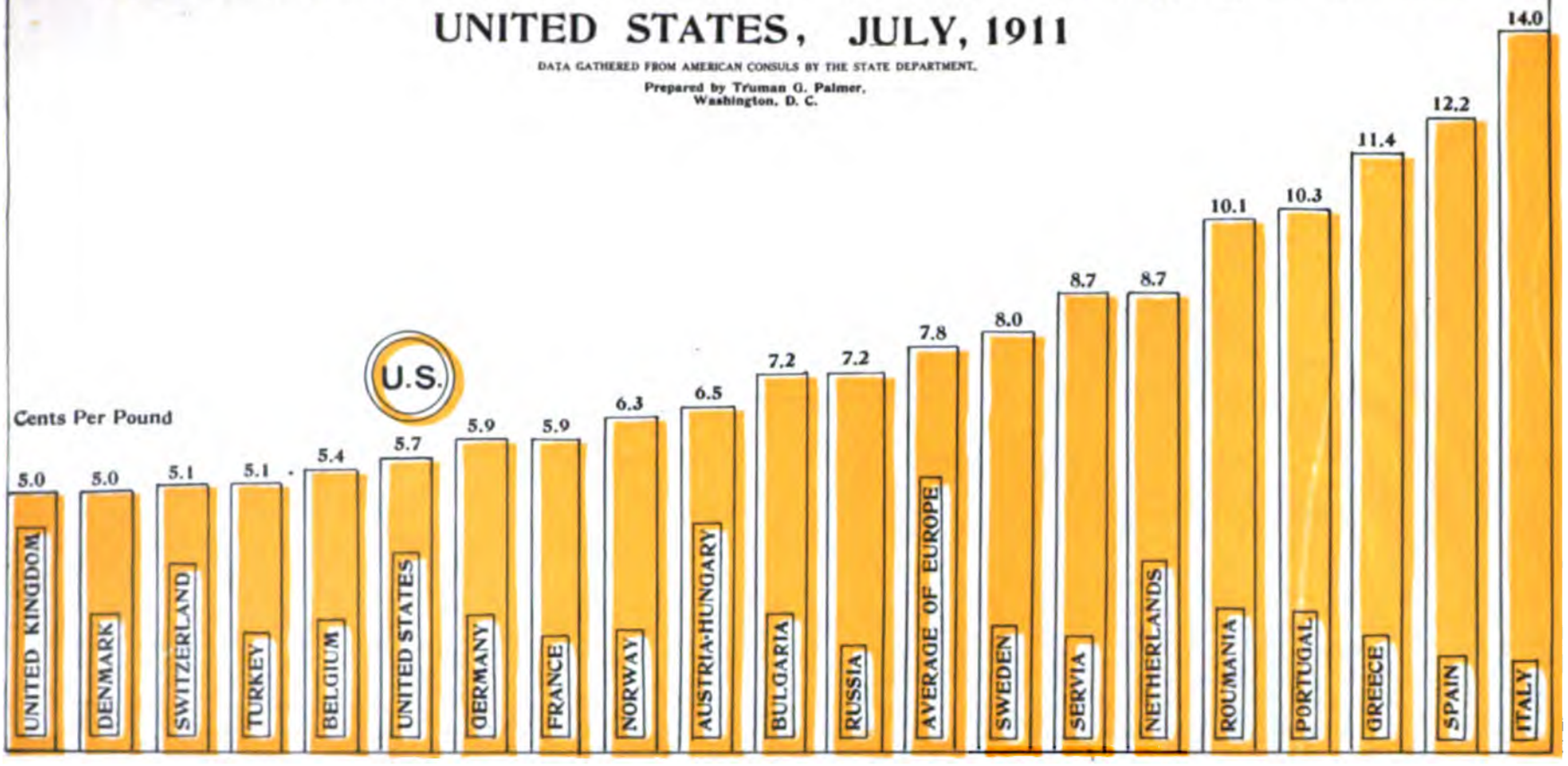
By a reduction of—	Gross annual saving per capita. Cents.	Annual loss in revenue per capita. Cents.	Net annual gain per capita. Cents.
10 per cent . .	7.23	5.83	1.40
15 per cent . .	10.84	8.75	2.09
20 per cent . .	14.45	11.66	2.79
25 per cent . .	18.07	14.58	3.49
30 per cent . .	21.68	17.50	4.18
33 1-3 per cent.	24.09	19.33	4.76
40 per cent . .	28 91	23.33	5.58
50 per cent . .	36.14	29.16	6.98
Free Sugar	72.28	58.33	13,95"

Chart No. 8

RETAIL PRICES OF GRANULATED SUGAR IN EUROPE AND THE UNITED STATES, JULY, 1911

DATA GATHERED FROM AMERICAN CONSULS BY THE STATE DEPARTMENT.

Prepared by Truman G. Palmer, Washington, D. C.



The quotations were gathered by the State Department from American consuls in Europe. The sugar ordinarily consumed by all classes in Europe is lump and loaf sugar which retails at one-half to two cents per pound higher than granulated, hence the average price paid for sugar by consumers in Europe is materially higher than is indicated by the chart. Sugar being more of a luxury in Europe than in the United States, lump and loaf sugar is made in 20 different sizes, to suit the incomes of all classes, the smallest loaves for the poorest people, and vice versa. The well-to-do buy this sugar because it is purer and whiter than European granulated and the poor buy it because it can be conveniently apportioned to each member of the family.

As a rule there are several grades of granulated sugar on European markets. Usually the best grade to be found is inferior to "Standard American Granulated" and would not find a ready sale in competition with our standardized sugar of the highest excellence.

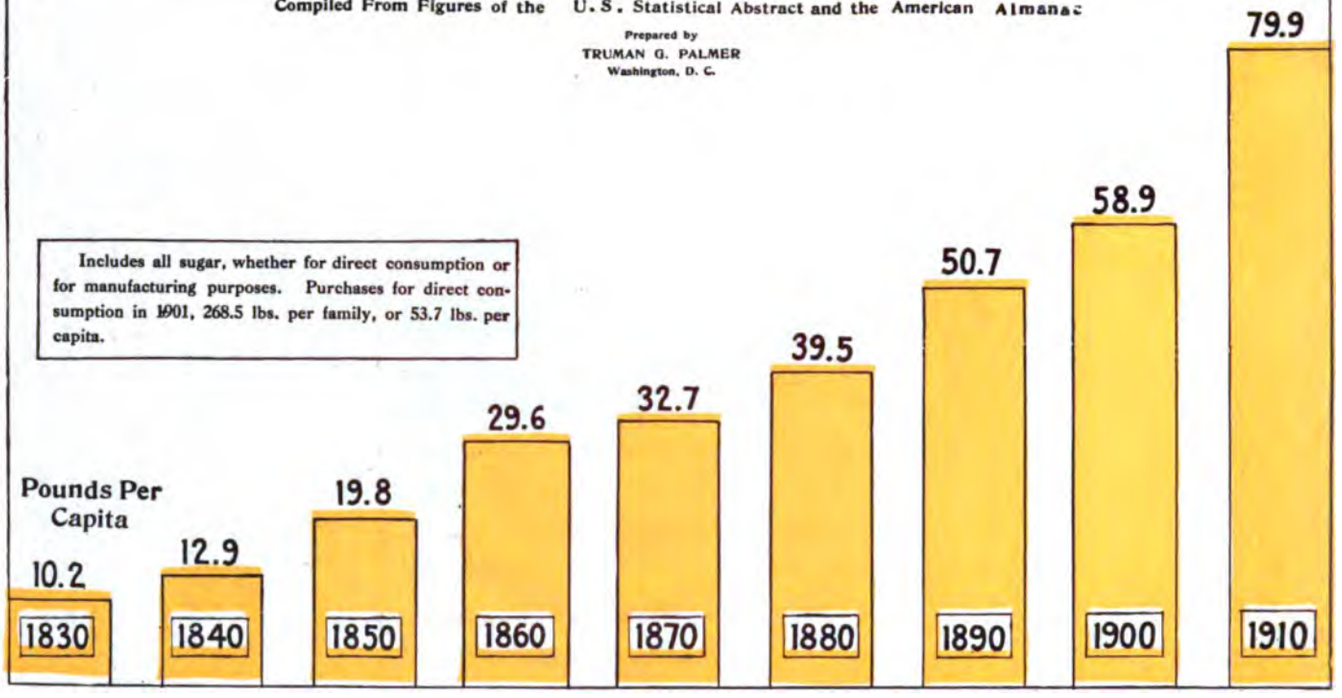
While the workingmen of Europe average to earn but one-third to one-half the wages earned by American workingmen, they average to pay 45 per cent more for a pound of second or third grade granulated sugar than American workingmen pay for a pound of the purest and handsomest sugar in the world.

From 1899 to 1909 the cost of producing sugar in the United States decreased 17 per cent and the wholesale and retail price of sugar was reduced in proportion. In European States the lowered cost of production is not reflected in the price of sugar for the reason that an excise or internal revenue tax of from one to eight cents per pound is levied on domestic sugar and on imported sugar there is collected not only the amount of the internal revenue tax but an additional amount sufficiently large to protect the domestic sugar from competition with tropical sugar. Under existing modes of sugar taxation, of all Temperate Zone sugar producing countries, only the people of the United States will be materially and directly benefited by a reduction in the cost of producing sugar.

Consumption of Sugar in the United States, Chart No. 9

Compiled From Figures of the U. S. Statistical Abstract and the American Almanac

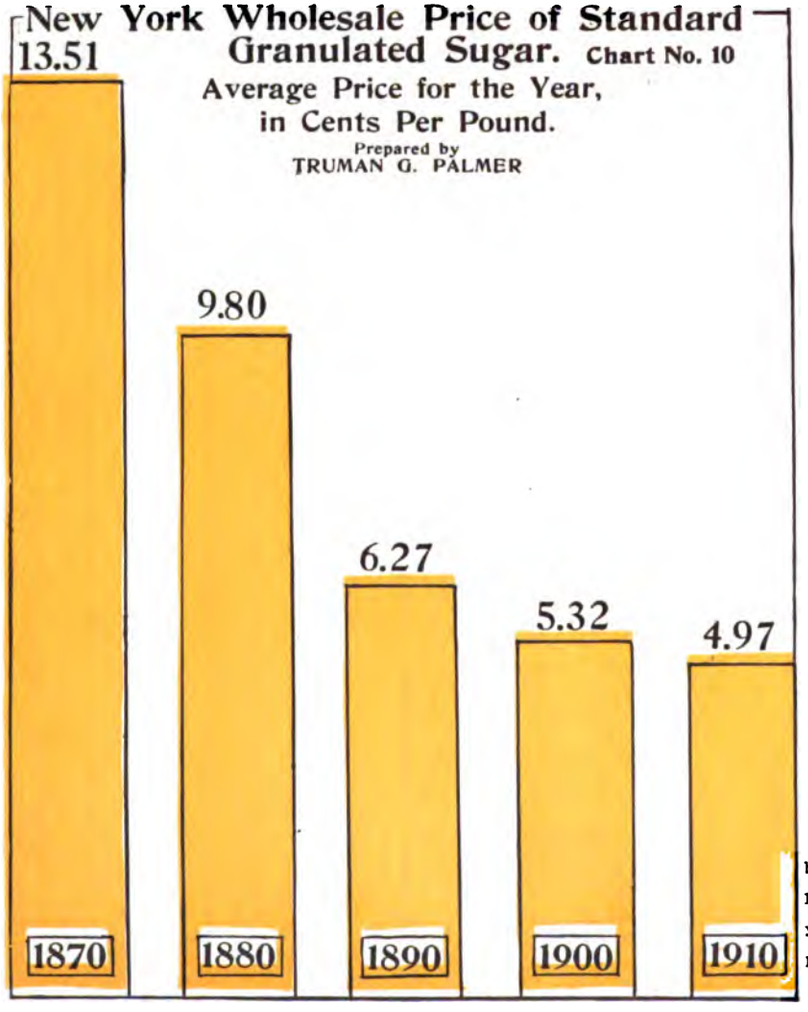
Prepared by
TRUMAN G. PALMER
Washington, D. C.



New York Wholesale Price of Standard Granulated Sugar. Chart No. 10

Average Price for the Year, in Cents Per Pound.

Prepared by
TRUMAN G. PALMER



Ten Years' Progress of the Beet-sugar Industry of the United States.

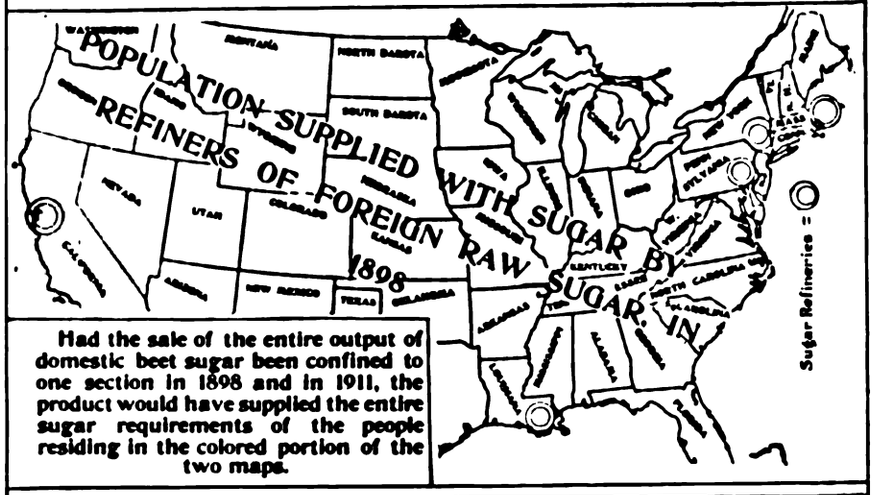
	1899	1904	1909	Increase in per cent, 1899 to 1909
AGRICULTURAL.				
Acres of beets harvested	135,300	240,800	416,000	207
Tons of beets harvested	794,658	2,175,417	3,965,800	399
Tons of beets harvested per acre	5.9	9.0	9.5	61
Price paid per ton of beets	$1.386	$5.2154	$6.00	86
Gross revenue per acre	$25.88	$46.94	$57.00	120
Total paid for beets	$3,485,320	$11,345,765	$23,791,800	583
MANUFACTURING.				
Number of establishments	30	[1] 51	65	117
Capital invested	$20,141,719	$55,923,459	[2] $71,274,970	254
Total disbursements [3]	$7,657,376	$22,251,741	$41,856,550	417
Sugar extracted per ton of beets . . . pounds	199.6	232.0	252.8	26
Amount of sugar produced (refined) . . . pounds	115,696,356	496,618,314	993,600,000	. . . .
Amount of sugar produced (raw) . . . pounds	47,771,719	11,223,607	9,800,000	. . . .
Total sugar produced [4] . . . pounds	158,680,904	506,719,561	1,002,420,000	534
Value of sugar [5]	$7,653,180	$23,972,902	$46,051,174	. . . .
Value of by-products	$101,276	$469,192	$2,194,000	2,066
Value of all products	$7,754,456	$24,442,094	$48,225,174	522
Cost of producing 100 pounds of sugar [6]	$1.2561	$3.8577	$3.6737	[7] 16
Cost of sugar in the beet per 100 pounds	$2.197	$2.229	$2.373	8

[1] 3 factories idle, 48 in operation.
[2] Based on capital per factory in 1904. Capital in 1909 not given by census.
[3] Includes cost of working up raw sugar, on basis of 33 cents per 100 pounds and 4 per cent of cost of plant for depreciation.
[4] Raw sugar converted to granulated on basis of 100 pounds of raw yielding 90 pounds of refined.
[5] Raw sugar converted to refined and valued at same price per pound.
[6] After deducting from the total expense the value of all by-products.
[7] Decrease.

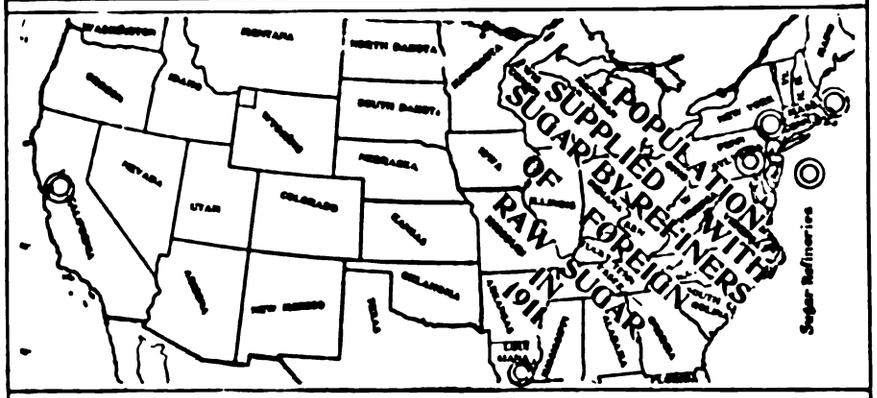
Chart No. 11

Growth of the Domestic Beet Sugar Industry.

Breaking the Monopoly of the Refiners of Foreign Raw Sugar.



Had the sale of the entire output of domestic beet sugar been confined to one section in 1898 and in 1911, the product would have supplied the entire sugar requirements of the people residing in the colored portion of the two maps.



In 1898 the small amount of beet sugar produced in California, Utah and Nebraska was not sufficient to influence the price of sugar in the local markets where it was sold. In 1911 the marketing of the domestic beet sugar crop forced down the price of all sugar a cent and three quarters a pound throughout the United States within ten weeks from the time it came on the market.

WHY THE SEABOARD REFINERS WANT THE DUTY REMOVED FROM IMPORTED RAW SUGAR.

Excepting domestic beet sugar, practically all sugar consumed by the American people is purchased as raw sugar by the four seaboard refining concerns, which fix the price consumers must pay for their refined product. All domestic beet sugar leaves the factory ready for the table and enters into direct competition with the product of the refiners of foreign raw sugar. During the three to five months in which domestic beet sugar is marketed, the competition it creates compels the refiners to reduce their prices or withdraw from the market. If there were no domestic beet sugar, the price of sugar would be higher during three to five months of each year, and if more beet sugar were produced, the price of sugar would be lower throughout the year.

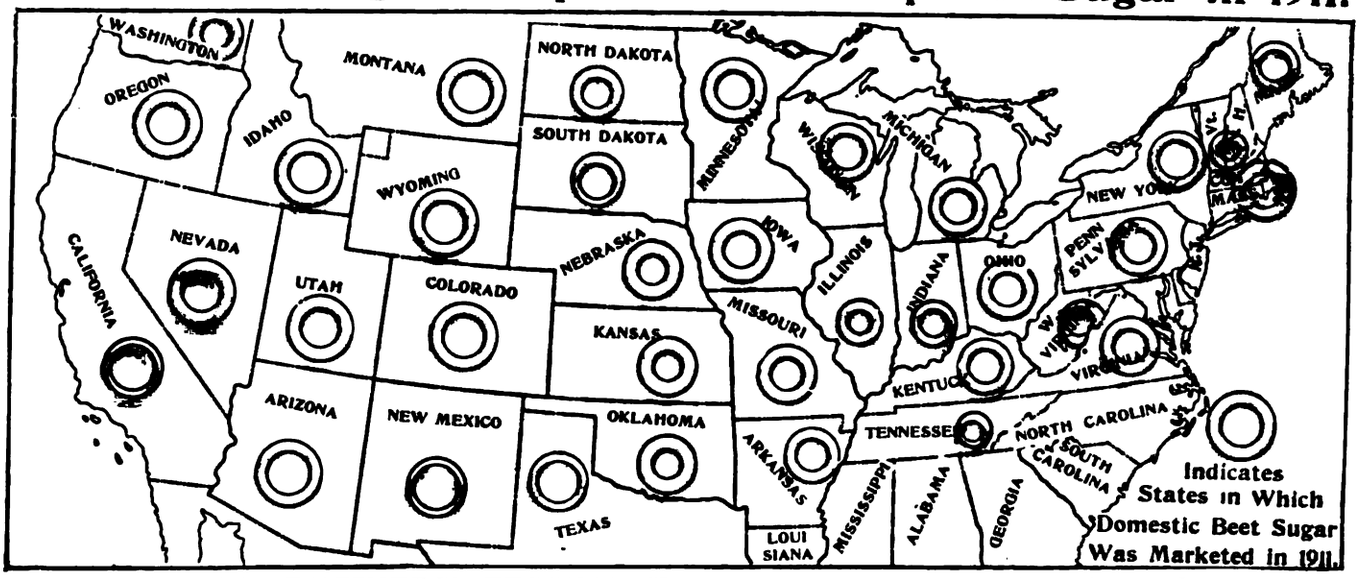
Knowing that with the prevailing high wage rate of the United States, sugar produced in this country could not compete with the raw sugars they purchase from low wage rate countries, unless a reasonable duty were imposed upon such sugars, the American refiners of foreign raw sugar are expending large sums of money in an effort to obtain free raw sugar from foreign countries, which would destroy their only competitor, after which they could raise the price of sugar at will.

The following extract from the testimony of Mr. Edwin F. Atkins, Acting President of the American Sugar Refining Company, in 1911, when before a Special Investigating Committee of the House of Representatives, explains the position of the refiners:

Mr. ATKINS. There is very much larger [refining] capacity than is required, and the beet sugars are taking away the trade of the refiners year by year. * * * All that beet-sugar comes on the market at a certain season of the year. It is all produced in about three months' time. They all want to market it just as rapidly as possible, and in order to do that they come to the eastern points. California sugar comes into Chicago and the Michigan sugar into Buffalo and Pittsburgh, and eastern refineries, not only the American Sugar Refining Co. but the others, have to reduce or close down until the beet sugars are out of the way. Any refining that is done between the 1st of October and the 1st of January is done without any profit and very often at a loss. * * * The beet-sugar business was a competitive business. It produced in the western territories, where our market lay. * * * As that industry grew—and I foresaw that it would grow rapidly—I believed that it would reduce the volume of business, not only of the American Sugar Refining Co. but of all the refiners on the Atlantic Coast; and although we had millions of dollars invested in the business there we were building up a competitive business, one that would compete with ourselves, and one which was bound to get away from us; we could not control it in the end.

Chart No. 12

Area of Beet Sugar Competition with Imported Sugar in 1911.



FROM SUGAR REFINERS' TESTIMONY IN 1911 BEFORE SPECIAL COMMITTEE OF THE HOUSE OF REPRESENTATIVES TO INVESTIGATE THE AMERICAN SUGAR REFINING COMPANY.

Claus A. Spreckels, President Federal Sugar Refining Co.

Mr. HINDS. Can you tell me how far in the East the beet-sugar people are able to market their sugar?

Mr SPRECKELS. * * * They sometimes come as far as Pittsburgh. I think the American Beet Sugar Co. has come once as far as New York City.

Mr. HINDS. Have they not come into New England?

Mr. SPRECKELS. I think so. * * *

Mr. HINDS. Are they showing a tendency to come farther east all the time?

Mr. SPRECKELS. They are.

Mr. HINDS. And they make the competition severer, if it is competition?

Mr. SPRECKELS. Yes.

Mr. HINDS. Continually?

Mr. SPRECKELS. Yes, sir. They have frequently come as far as Pittsburgh. (P. 2269 of hearings.) * * *

Mr. HINDS. In other words, perhaps you would take it [the tariff] all off, would you not, and have free trade?

Mr. SPRECKELS. I would have free trade. (P. 2277 of hearings.)

Mr. HINDS. You would have free trade in sugar?

Mr. SPRECKELS. Absolutely. (P. 2278 of hearings.)

William G. Gilmore, Partner, Arbuckle Bros., Sugar Refiners.

Mr. RAKER. The beet-sugar people got in Pittsburgh, Pa.?

Mr. GILMORE. Yes. * * *

Mr. GILMORE. The home beet-sugar industry of course is curtailing the sale of the cane-sugar products.

Mr. MADISON. It would be beneficial [removing the duty from sugar] inasmuch as it would destroy the beet-sugar people?

Mr. GILMORE. It would keep them at home.

Mr. MADISON. Keep them in a limited locality?

Mr. GILMORE. Yes. (P. 1168 of hearings.)

William A. J. Jamison, Partner, Arbuckle Bros.

Mr. RAKER. Michigan sugar, you say, competes with yours in New York?

Mr. JAMISON. Yes; the Michigan sugar has been down to New York State and all through there. It has interfered with us very largely in sales in Ohio and Pennsylvania.

Mr. RAKER. And West Virginia?

Mr. JAMISON. Yes. * * *

Mr. RAKER. Do you not have a supply all the time?

Mr. JAMISON. Well, we are not able to run full at all times.

Mr. RAKER. Because of the way raw sugar is shipped into the United States?

Mr. JAMISON. Oh, no; on account of the beet product. If there was no duty, I do not think the beet would be so prosperous, and we would probably sell more sugar. If the duty was removed, I mean to say. (P. 1195 of hearings.)

Robert M. Parker, President of the Brooklyn Cooperage Co., Owned by the American Sugar Refining Co.

Mr. MALBY. Does the American Sugar Refining Co. at the present time ship any granulated sugar to the various States in the Mississippi Valley and in the Missouri region?

Mr. PARKER. Yes, sir; a very great deal.

Mr. MALBY. And at all times of the year?

Mr. PARKER. Yes, sir; until the price is so low that it is impossible to ship it at a profit.

Mr. MALBY. Who makes the prices low, or creates the condition to which you refer?

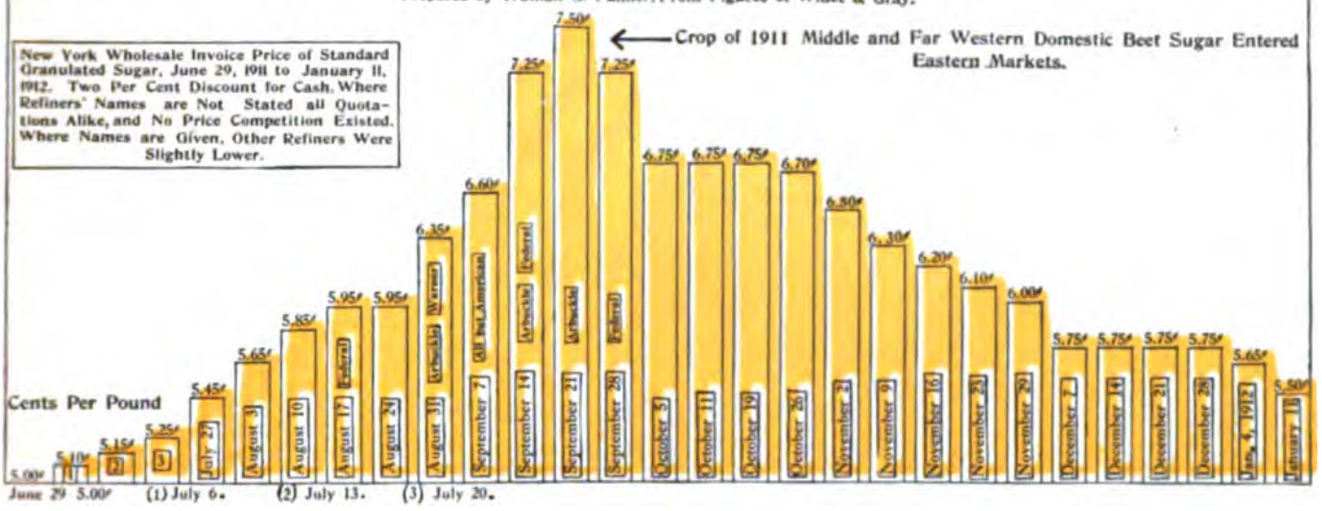
Mr. PARKER. The San Francisco cane, and the beet sugars from Colorado and Utah and Michigan. (P. 1463 of hearings.)

Chart No. 13

The Abnormally High Price of Sugar in 1911.

Increase of Two and One-half Cents Per Pound in Three Months Checked by Marketing Domestic Beet Sugar Crop which Lowered the Price One and Three-quarters Cents in Ten Weeks.

Prepared by Truman G. Palmer, From Figures of Willet & Gray.



[From testimony before Special Committee of House of Representatives, 1911.]

Dr. Harvey W. Wiley, Chief of the Bureau of Chemistry, Department of Agriculture.

Dr. WILEY. But the point I am giving is this, that under the present system we are absolutely dependent upon the refiners of this country for our sugar. * * *

At the same time, whenever the Louisiana sugar comes in the price of sugar drops, and whenever the crop of beet sugar comes in the price of sugar drops. Again, as soon as the Louisiana and beet sugar men sell all they have to sell the price of sugar goes up again. * * *

Mr. FORDNEY. And as soon as the crop is purchased they increase the price, do you mean?

Dr. WILEY. Yes; as high as they think the people will stand for. They do not put the price out of sight, because that would not be good business. * * *

Wallace P. Willett, of Willett & Gray, Publishers Weekly Statistical Sugar Trade Journal.

If it were not for the domestic sugar industry sugars in this country would be to-day very considerably higher. * * * I would not be surprised if it would not be a cent a pound more but for the beet and cane sugar produced in this country. * * * There is no question whatever, Mr. Chairman, that the coming onto the market in October of the Michigan sugars and other domestic sugars dropped the price from 6.57 in October down to 6.1 in November, and December 5.63. * * * The moment our American beet-sugar production became available on the market the rise stopped, and, owing entirely and totally to this American production, refined sugars were a cent and a half lower than they were at the highest point. But for that American production, we to-day would be buying sugar at the world's prices. * * *

Mr. HINDS. You speak of our being independent of Europe?

Mr. WILLETT. Yes.

Mr. HINDS. Even, although we produced enough to, as you might say, supply ourselves, nevertheless that would not give us sugar any cheaper than they would get it in Europe on that specific year, would it?

Mr. WILLETT. It would give us sugar always cheaper than they would get it in Europe in any year, if I understand your question right. * * *

This promotion of our industry is a much more vital point (from the consumers' standpoint included) than is a reduction of tariff to a point that lets in foreign sugar and thereby diminishes the home production. Whenever we reach the condition indicated, competition between our free and partially free duty producers will begin and the consumers will benefit thereby.

In all these analyses I reach the same conclusion—that to decrease the price of sugar to the consumer, increase the domestic production as rapidly as possible.

Frank C. Lowry, Sales Agent, Federal Sugar Refining Company.

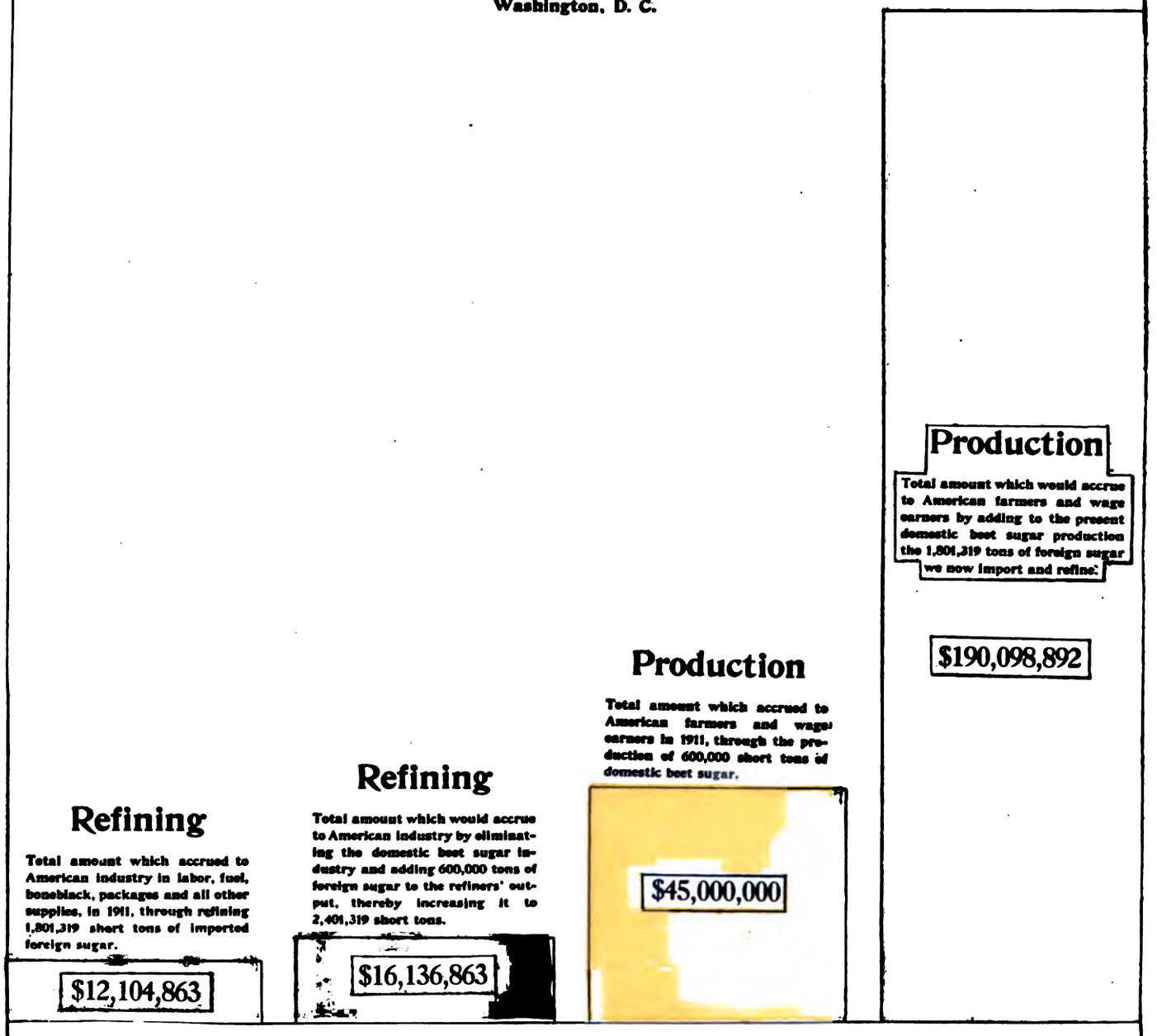
Mr. FORDNEY. * * * I want to know what the Federal Sugar Refining Co. sold sugars for.

Mr. LOWRY. The Federal Sugar Refining Co. and other refineries on July 6 advanced their price from 5 to 5.1. * * * Now, the market advanced right on up to 6.75, and the trade kept buying on each successive advance. * * * The demand came on to us so fast we could not take care of it and we went to 7 cents. Arbuckle & Co. were delivering promptly and they went to 7 cents. We were about ten days oversold at the time, and Arbuckle was the only refiner prepared to give immediate delivery, and he jumped his price to 7.5 cents. * * * We wanted to keep in the market and supply our customers right along, and we put the price at 7.25, and at 7.25 the market stopped, and from that time on, whether we talk about beet sugars or cane sugars, the market became absolutely a jobber's market. The beet-sugar price was 6.5 cents.

Chart No. 14

Sugar Production Versus Sugar Refining

Prepared by Truman G. Palmer,
Washington, D. C.


Refining
Total amount which accrued to American industry in labor, fuel, boneblack, packages and all other supplies, in 1911, through refining 1,801,319 short tons of imported foreign sugar.
$12,104,863
Refining
Total amount which would accrue to American industry by eliminating the domestic beet sugar industry and adding 600,000 tons of foreign sugar to the refiners' output, thereby increasing it to 2,401,319 short tons.
$16,136,863
Production
Total amount which accrued to American farmers and wage earners in 1911, through the production of 600,000 short tons of domestic beet sugar.
$45,000,000
Production
Total amount which would accrue to American farmers and wage earners by adding to the present domestic beet sugar production the 1,801,319 tons of foreign sugar we now import and refine.
$190,098,892

Refining sugar might be compared with the process of laundering, inasmuch as its sole purpose is to eliminate the four per cent of dirt and impurities which raw sugar usually contains. The difference is that the sugar refiner buys the dirty shirt and sells the clean one at his own price. Refining sugar bears about the same relation to the cost and process of producing sugar as the cost and process of bleaching cotton cloth bears to the cost of raising the cotton and producing unbleached muslins.

The president of the National Sugar Refining Company when before the Industrial Commission gave in detail the cost of refining raw sugar. He showed that in refining one ton of imported raw sugar, there accrues to American industry for labor, office help, fuel, boneblack, packages and all other supplies, $6.72.

The United States Census Reports and the testimony given before the Special Committee of the U. S. House of Representatives to investigate the American Sugar Refining Company show that the cost of producing beet sugar in the United States varies materially, but that the average cost is 3¾ cents per pound or $75 per short ton, all of which accrues to American farmers and wage earners.

The columns represent the gain to American industry by producing sugar and by refining imported raw sugar produced in a foreign land. The amounts set forth do not cover the production or refining of the product of Louisiana, Texas, Hawaii, Poto Rico and the Philippines, which already is produced under the American flag.

The United States and Great Britain are the only great nations which continue to import quantities of raw sugar for refining purposes. All other great nations produce their sugar at home and distribute the money to their own people. Abraham Lincoln said: "I don't know much about political economy, but I do know this, that when we purchase a ton of steel rails from Great Britain for $100, Great Britain gets the money and we get the rails, and when we produce the rails from our own mines and in our own mills, we have both the money and the rails."

The Home Production of One Ton of Beet Sugar Returns as Much to American Labor as the Refining of Eleven Tons of Foreign Raw Sugar..

Chart No. 15

THE UNITED STATES COULD PRODUCE ITS SUGAR.

Area now Planted to Sugar-Beets and Yielding 600,000 Tons of Sugar Annually.

500,000 Acres.

Area necessary to be Planted to Sugar Beets from which to Produce the $300,000,000 worth of Sugar now Purchased Annually from Foreign Countries.

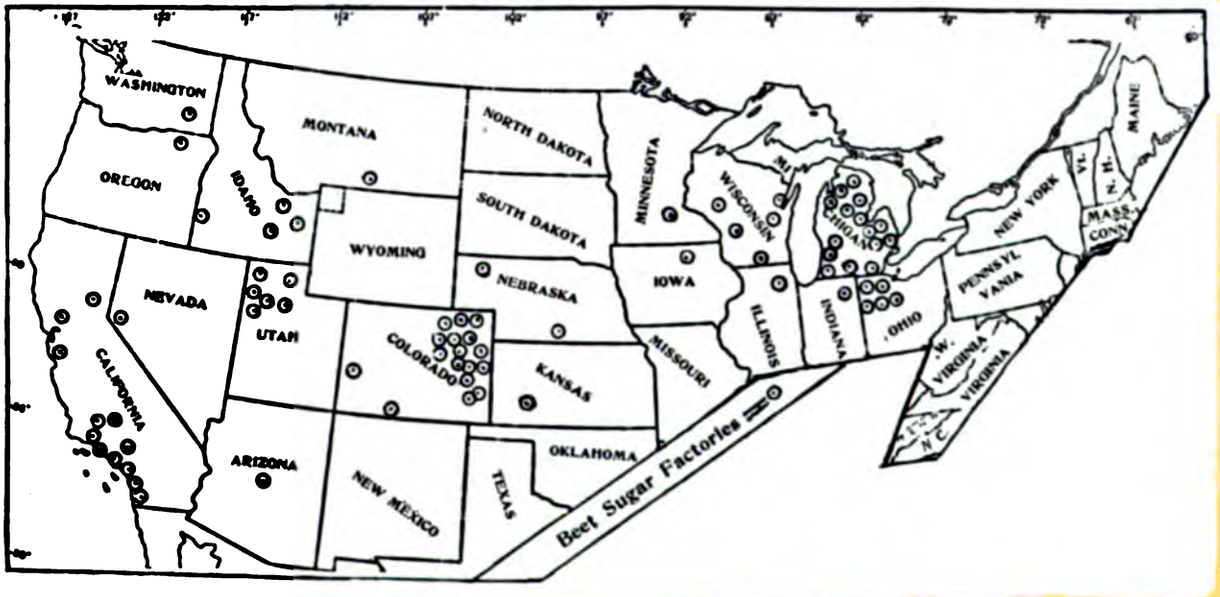
1,671,000 Acres.

Prepared by Truman G. Palmer, Washington, D. C.

Indicates Boundaries of 274,000,000 Acres.

SUGAR-BEET AREA OF THE UNITED STATES, 274,000,000 ACRES.

"We are therefore justified in saying that the total area having soil and climatic conditions adapted to the production of satisfactory sugar beets is at least 274,000,000 Acres." James Wilson, Secretary of Agriculture, in Senate Document No. 22, 61st Congress, First Session.



As to territory, the United States could produce enough beet sugar in one year to supply the world's requirements for two decades. While not scientifically accurate, the map above roughly outlines the southern and Atlantic Coast limit where sugar beets for factory purposes can be produced in the United States.

It is not to be expected that all United States farmers in the sugar beet area ever could rotate their cereal crops with sugar beets grown for sugar-making purposes. The world market for sugar would not be sufficient to absorb what they would produce, but, as was the case in Europe where the introduction of sugar beet culture doubled the yield of all other crops, the farmers soon would be led to produce sugar beets, mangolds, turnips and other head-root crops for stock-feeding purposes in areas where there were no factories to purchase the beets.

The experiments made by the United States Department of Agriculture on low lying areas near the Atlantic Ocean do not show as high a percentage of sugar or as high a purity as those made on the higher areas somewhat removed from the ocean. The elevated lands of northwestern North Carolina, northeastern Tennessee and northeast through the westerly portion of Virginia and Maryland, and Pennsylvania, Connecticut, Massachusetts, New Hampshire and Maine, and the territory to the north and west, can produce beets successfully for factory purposes. The southern portions of Ohio, Indiana, Illinois, Missouri, Oklahoma and Texas and the territory further south, will not produce as rich beets as will the northern portions of those States and the territory lying north and west of them. The most southerly factories in the United States are located in southern California and at Phoenix, Arizona; the most northerly, at Billings, Montana, and Waverly, Washington, 790 miles to the north. Both extremes produce rich beets.

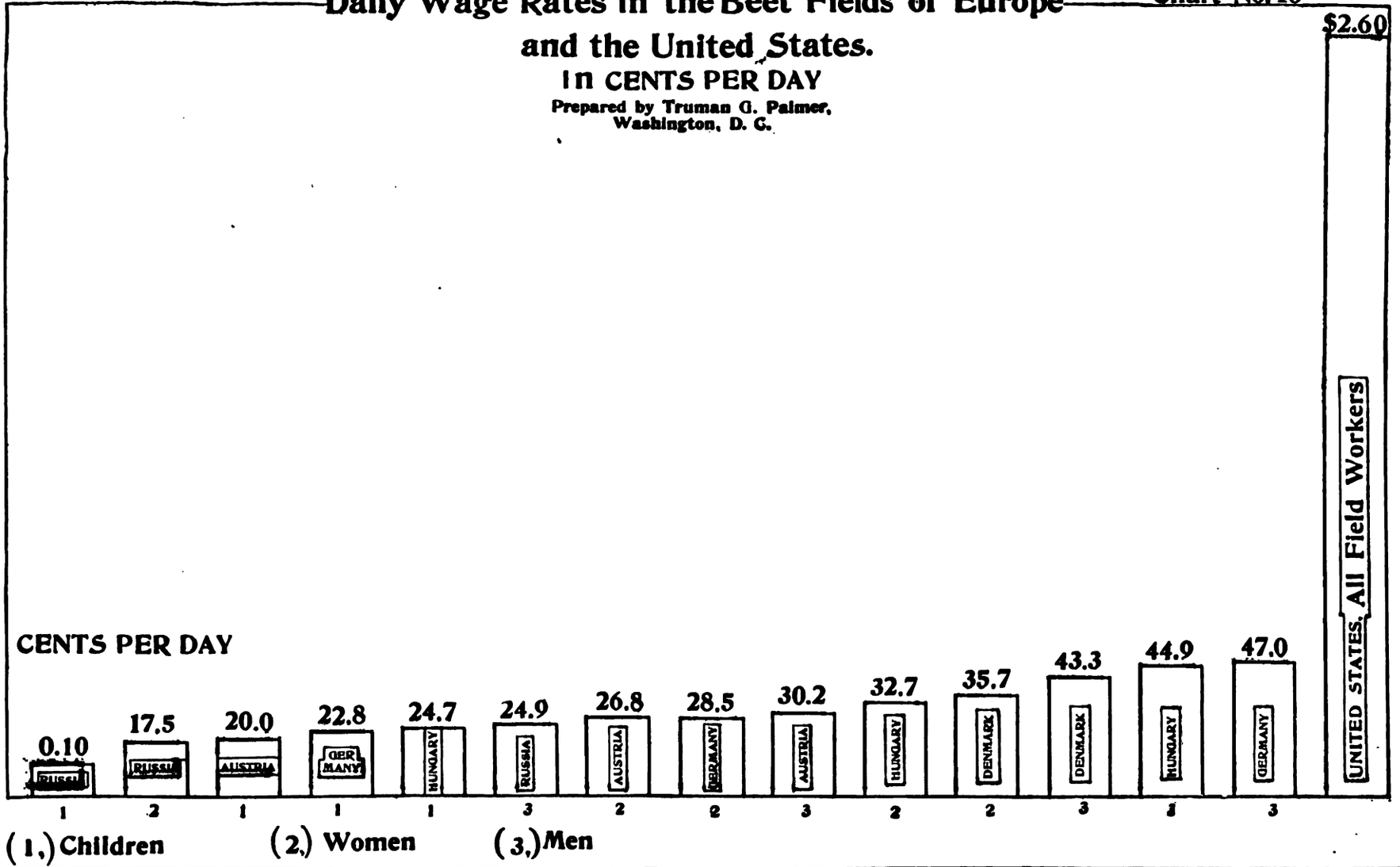
The 1200 beet sugar factories of Europe are scattered from the Mediterranean on the south to the Baltic on the north, and from the Straits of Dover on the west to central Russia on the east. Longitude has no effect on the richness of sugar beets. Persia, Manchuria, Australia and Canada produce beet sugar. Sugar beets acclimate themselves in a greater area than do most other crops.

Daily Wage Rates in the Beet Fields of Europe and the United States.

Chart No. 16

In CENTS PER DAY

Prepared by Truman G. Palmer, Washington, D. C.



In numerous instances, both in the United States and Europe, sleeping accommodations, fuel and one or more meals are furnished, in addition to the cash paid, but in no case has any attempt been made to estimate the value of such extras. The chart represents only the cash paid to the laborers.

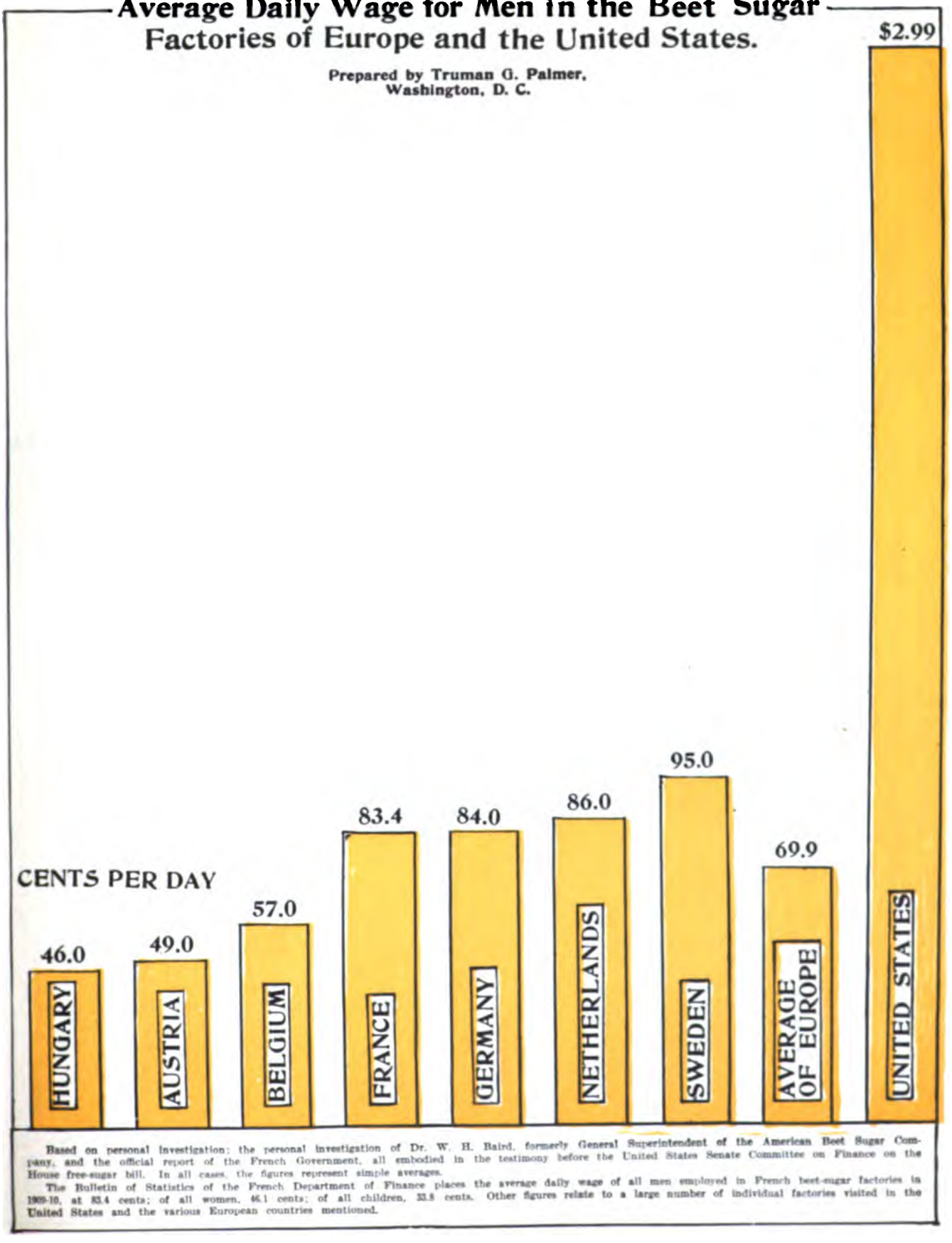
The wage average for the United States is the average of 76 reports on day wages and piece work earning in the various sugar beet districts from Michigan to California. Fifty-one reports were for day wages, and showed an average of $2.21 per day. Twenty-five reports covered earnings by piece work and showed an average of $3.25 per day.

The wage averages for Europe are based upon 117 reports gathered by the writer in the countries named, by a commission appointed by the French Syndicate of Sugar Manufacturers and by the agricultural adviser of the National Sugar Beet Association, of London. The majority of the reports cover the amounts earned daily by the prevailing system of piece work and are materially higher than the prevailing wage for day labor. Of the 117 reports, 65 cents a day was the highest and 46 cents the average amount earned by men. Thirty-six cents was the average daily earning for both men and women. The day's work is "from sun up to sun down," which was stated to mean in that northerly latitude from 4 to 5 in the morning to 7 to 10 at night. Much of the field work in the European countries mentioned is performed by Polish and Gallician women and girls who are as efficient as men. They are brought by train-loads in the spring and returned in the fall, Germany alone importing more than 100,000 annually. Their diet consists of potatoes and black bread, with an occasional sausage or piece of bacon shipped from home by parcels post. As a rule a man and his wife accompany each twenty women and girls, the man to oversee, the woman to cook. They are housed in barracks, the care and sanitation of which are under police surveillance. In Denmark, the hours are from 5 to 6 A. M. to 10 to 11 P. M., and they average to earn 15 pounds sterling, or $73 per season from March or April to October.

Chart No. 17

Average Daily Wage for Men in the Beet Sugar Factories of Europe and the United States.

Prepared by Truman G. Palmer, Washington, D. C.



Based on personal investigation; the personal investigation of Dr. W. H. Baird, formerly General Superintendent of the American Beet Sugar Company, and the official report of the French Government, all embodied in the testimony before the United States Senate Committee on Finance on the House free-sugar bill. In all cases, the figures represent simple averages.

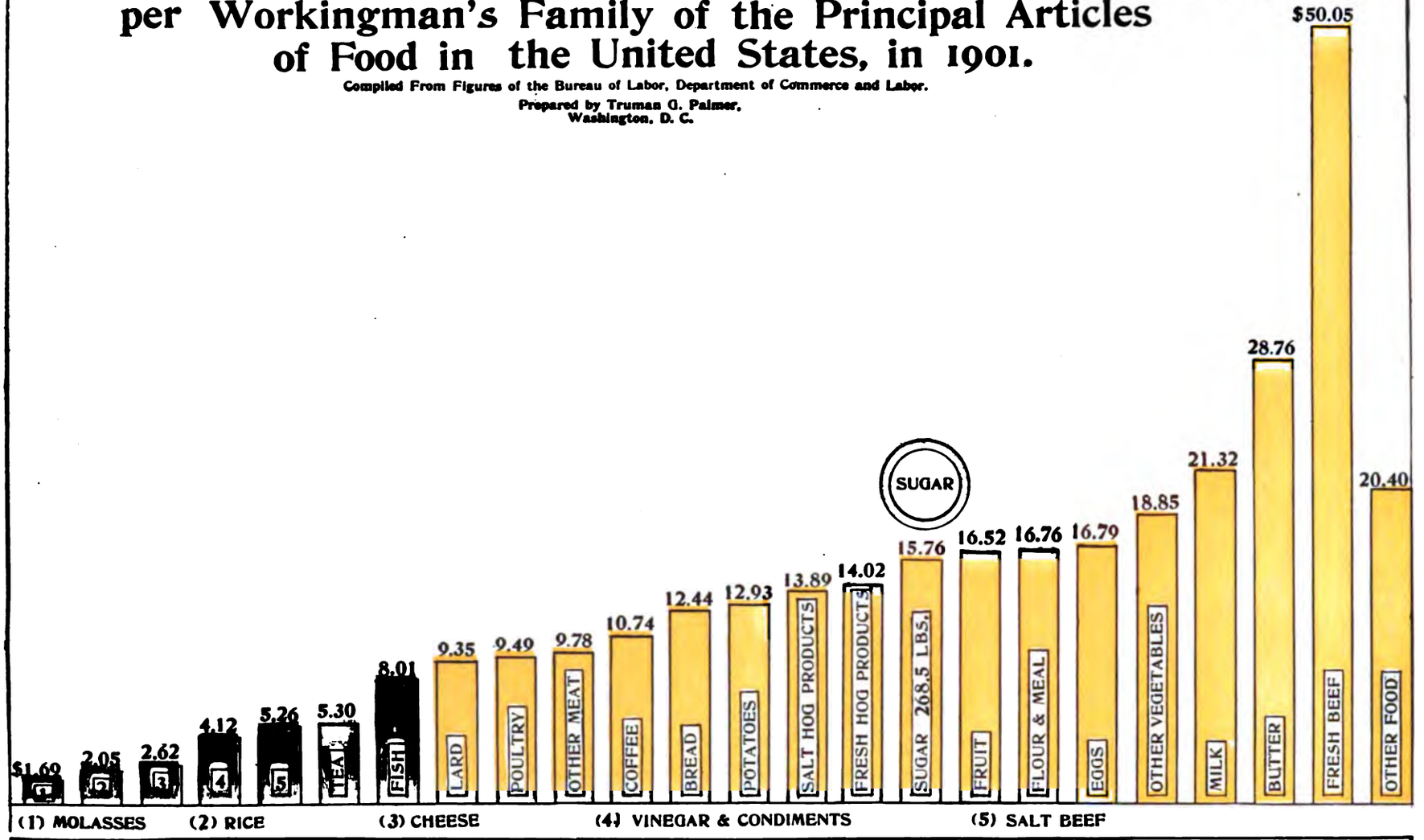
The Bulletin of Statistics of the French Department of Finance places the average daily wage of all men employed in French beet-sugar factories in 1909-10, at 83.4 cents; of all women, 46.1 cents; of all children, 33.8 cents. Other figures relate to a large number of individual factories visited in the United States and the various European countries mentioned.

Chart No. 18

The Price of Sugar and Its Relation to the Average Annual Cost per Workingman's Family of the Principal Articles of Food in the United States, in 1901.

Compiled From Figures of the Bureau of Labor, Department of Commerce and Labor.

Prepared by Truman G. Palmer, Washington, D. C.



As shown by the Bureau of Labor the total expenditure per family of 2,567 workingmen's families for the principal articles of food consumed in 1901 was $326.90. The average amount of sugar purchased per family was 268.5 pounds and the average cost of the same was $15.76, which is equal to five per cent of the total annual expenditures for the principal articles of food purchased.

The average rate of import duty collected on all foreign sugar entering the United States is 1.346 cents per pound, or $3.61 on 268.5 pounds. The amount of duty actually raised from customs on sugar imports amounts to 58.3 cents per capita of population or $2.91 per family of five, which amount of National revenue with which to operate the Federal Government, if not raised from sugar customs, necessarily would be derived from the people through an increase of duty on other commodities or in some other form.

A slight reduction in the duty of sugar would have no effect on the retail price of that article. A serious reduction in or a removal of the duty on sugar would enable the seaboard refiners of imported raw sugar so to reduce the price of refined sugar as to destroy the domestic sugar-producing industry, after which, with a complete monopoly of the sugar business, the refiners could fix at will the price American consumers would be compelled to pay for their product.

Except for a temporary reduction in the price of sugar, it is not believed that a reduction in the duty would be reflected in the retail price of sugar in the United States, but if sugar were placed on the free list and its price thereby was lowered by the full amount of the duty remitted, the net annual saving would be 14 cents per capita or 70 cents per family of five, or one-fifth of one per cent of the average annual expenditures of laboring men's families for the principal articles of food.

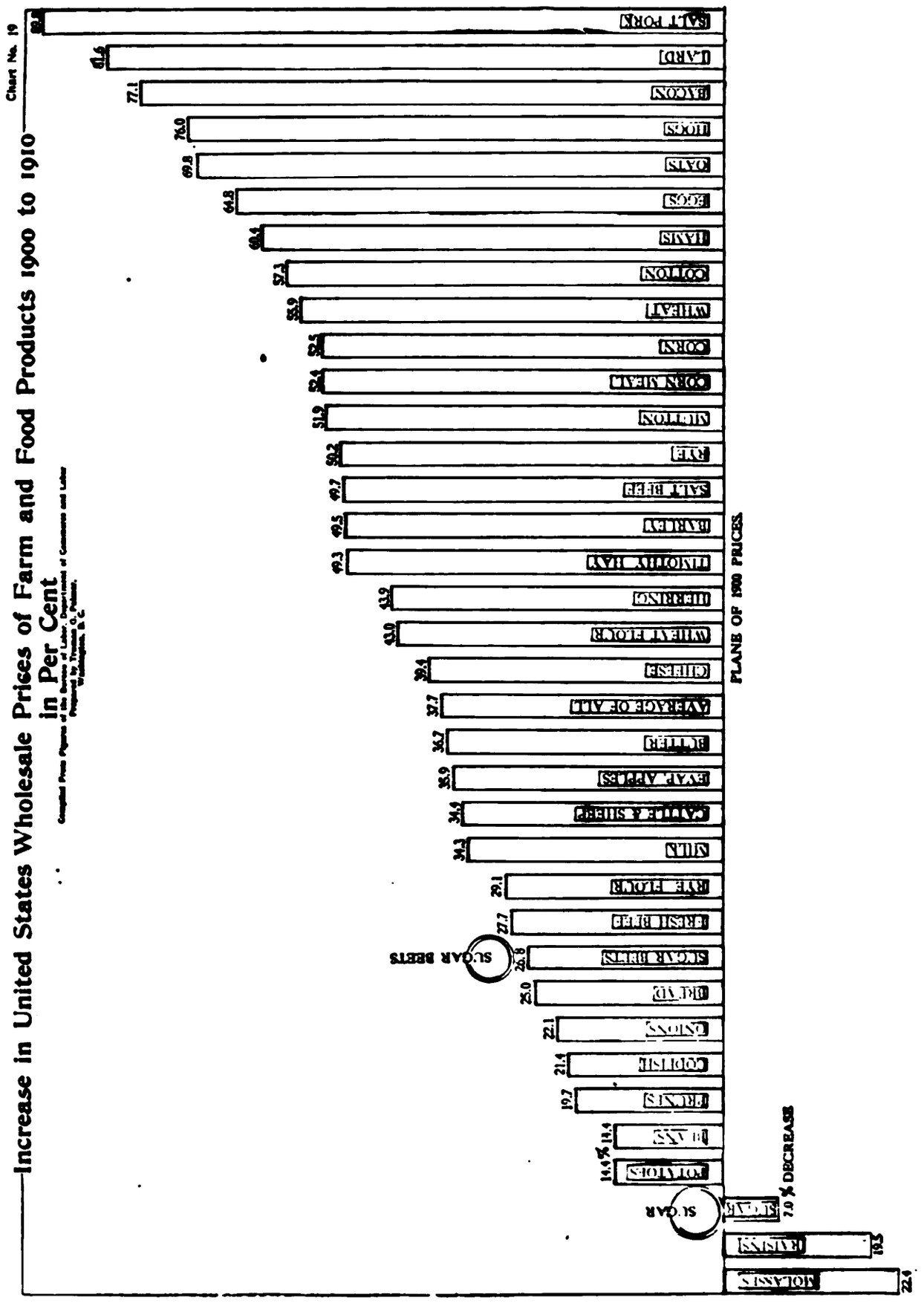


Chart No. 19
Increase in United States Wholesale Prices of Farm and Food Products 1900 to 1910
in Per Cent
Compiled From Figures of the Bureau of Labor, Department of Commerce and Labor
Prepared by Division of Publications
Washington, D. C.
SALT PORK
LARD
BACON
HOGS
OATS
EGGS
HAMS
COTTON
WHEAT
CORN
CORN MEAL
MUTTON
RYE
SALT BEEF
BARLEY
TIMOTHY HAY
HORSES
WHEAT FLOUR
CHEESE
AVERAGE OF ALL
BUTTER
EVAP. APPLES
CATTLE & SHEEP
MILK
RYE FLOUR
FRESH BEEF
SUGAR BEETS
SUGAR
BUCKWHEAT
POTATOES
COFFEE
PEACHES
HAY
POTATOES
SUGAR
PEANUTS
MOLASSES
PLANE OF 1900 PRICES
7.0 % DECREASE
14.6 %
SUGAR BEETS
76.0
69.8
64.8
60.4
57.1
55.9
55.5
55.4
51.9
50.2
49.7
49.5
49.3
43.9
43.0
39.4
37.7
36.7
35.9
34.4
34.3
29.1
27.7
25.8
25.0
22.1
21.4
19.7
18.4
14.6
7.0
18.5
22.4

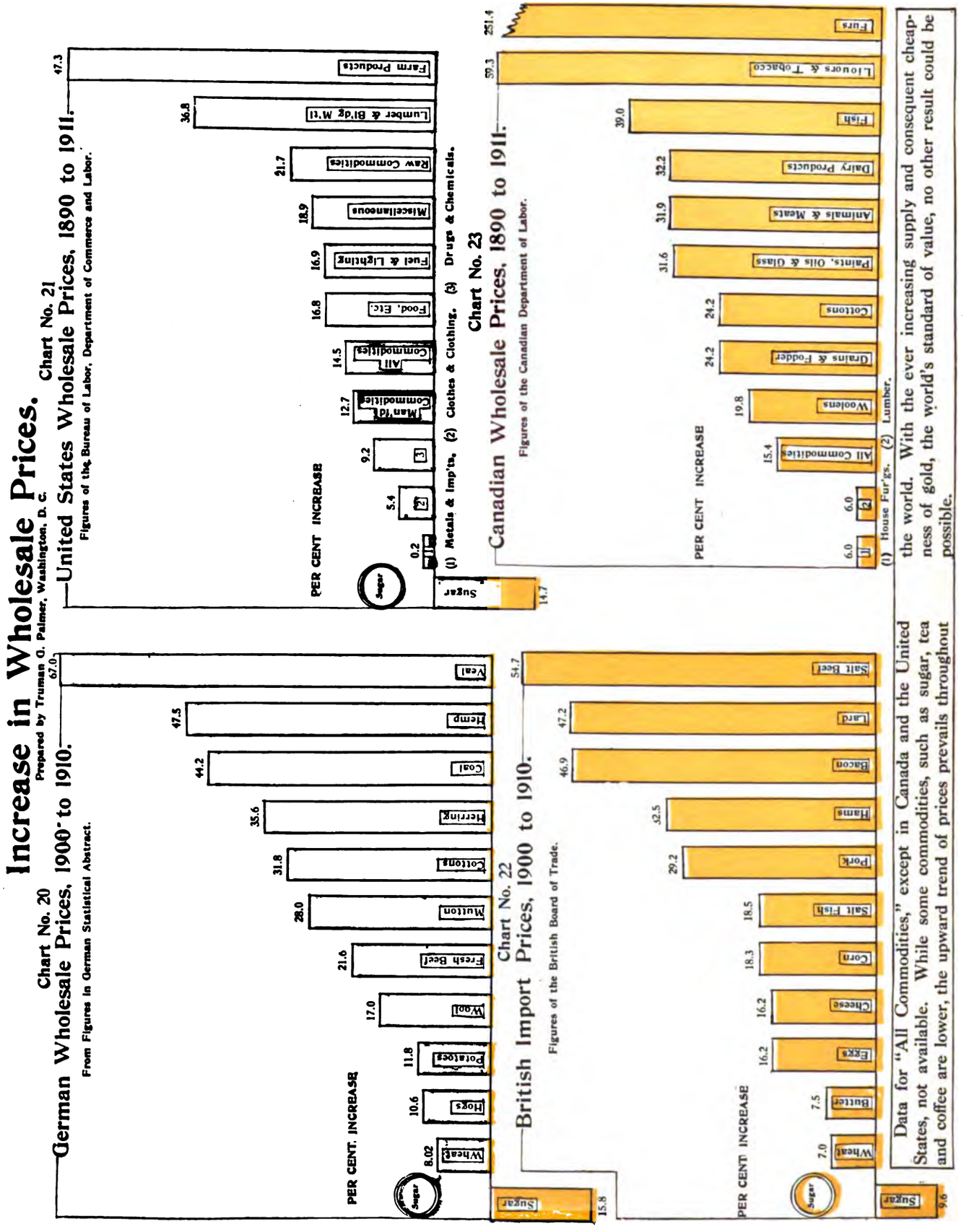
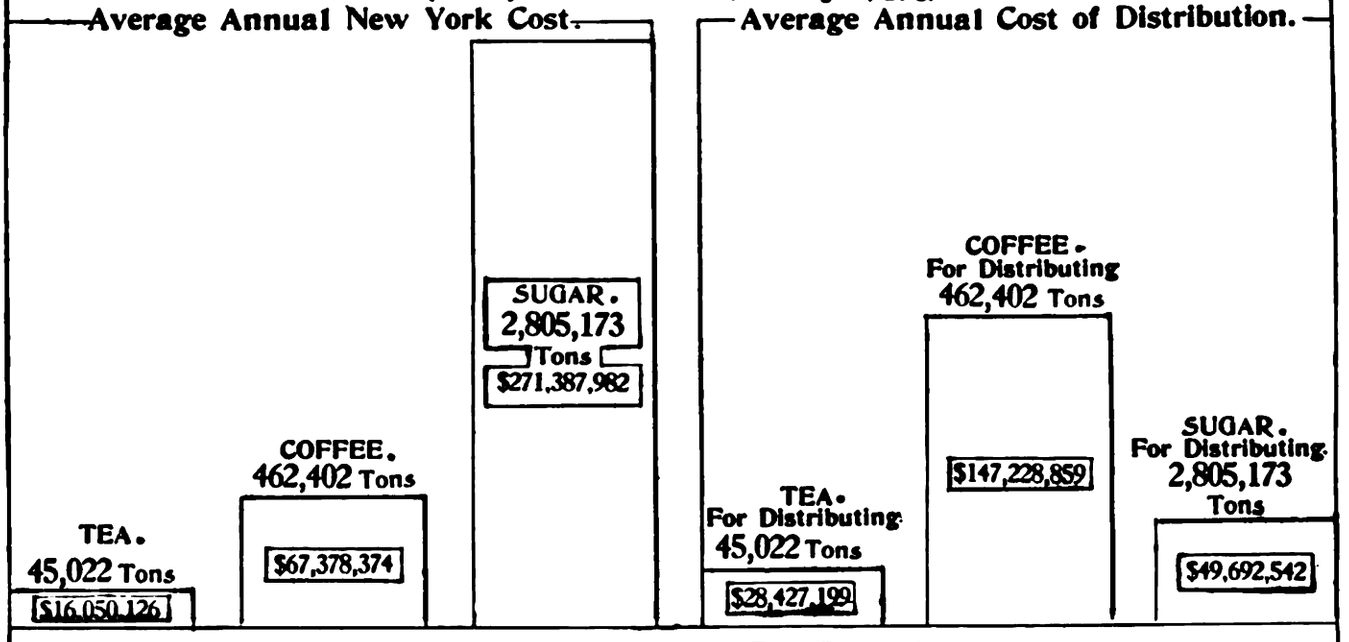
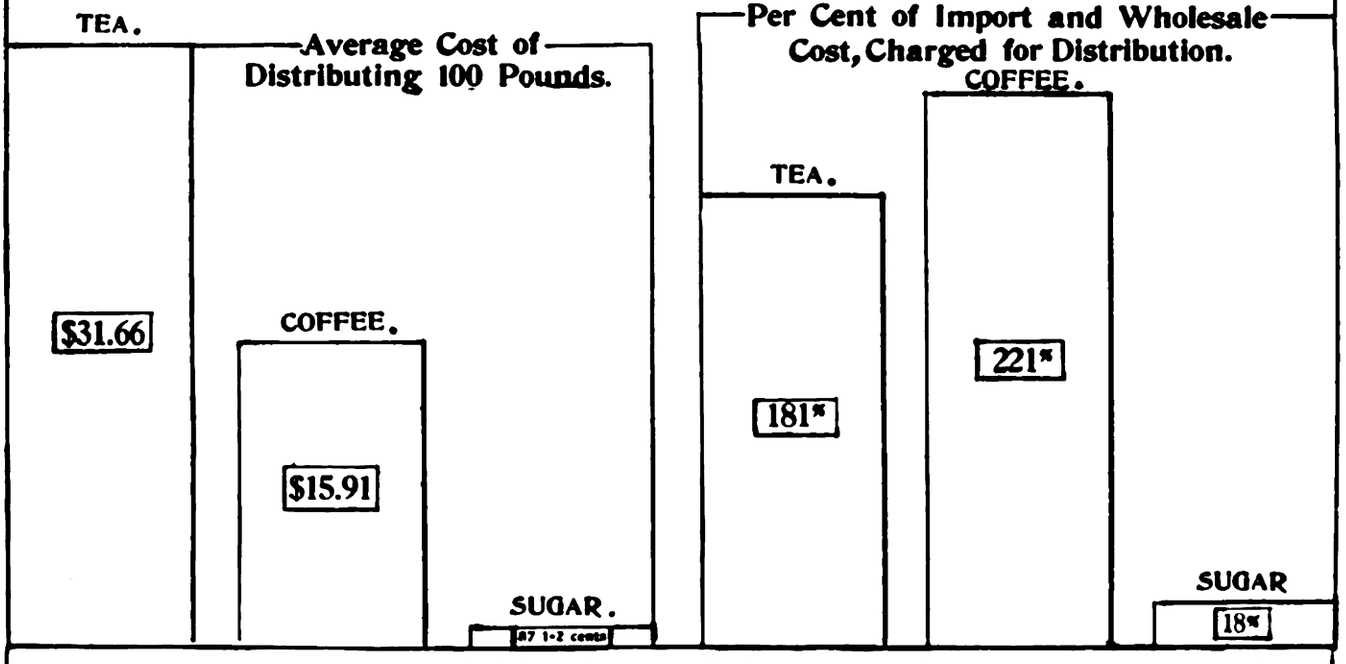

Increase in Wholesale Prices.
Prepared by Truman G. Palmer, Washington, D. C.
Chart No. 20
German Wholesale Prices, 1900 to 1910.
From Figures in German Statistical Abstract.
PER CENT. INCREASE
Sugar 8.02
Wheat
Hogs 10.6
Potatoes 11.8
Wool 17.0
Fresh Beef 21.6
Mutton 28.0
Cottons 31.8
Herring 35.6
Coal 44.2
Hemp 47.5
Veal 67.0
Chart No. 21
United States Wholesale Prices, 1890 to 1911.
Figures of the Bureau of Labor, Department of Commerce and Labor.
PER CENT INCREASE
Sugar 0.2
(1) 5.4
(2) 9.2
(3) 12.7
All Commodities 14.5
Food, Etc. 16.8
Fuel & Lighting 16.9
Miscellaneous 18.9
Raw Commodities 21.7
Lumber & Bldg M'ts 36.8
Farm Products 47.3
(1) Metals & Imp'ts. (2) Clothes & Clothing. (3) Drugs & Chemicals.
Chart No. 22
British Import Prices, 1900 to 1910.
Figures of the British Board of Trade.
PER CENT INCREASE
Sugar 15.8
Wheat 7.0
Butter 7.5
Eggs 16.2
Cheese 16.2
Corn 18.3
Salt Fish 18.5
Pork 29.2
Hams 32.5
Bacon 46.9
Lard 47.2
Salt Beef 54.7
Chart No. 23
Canadian Wholesale Prices, 1890 to 1911.
Figures of the Canadian Department of Labor.
PER CENT INCREASE
Sugar 14.7
(1) 6.0
(2) 6.0
All Commodities 15.4
Woolens 19.8
Grains & Fodder 24.2
Cottons 24.2
Paints, Oils & Glass 31.6
Animals & Meats 31.9
Dairy Products 32.2
Fish 39.0
Liquors & Tobacco 59.3
Furs 251.4
(1) House Fur'gs. (2) Lumber.
Data for "All Commodities," except in Canada and the United States, not available. While some commodities, such as sugar, tea and coffee are lower, the upward trend of prices prevails throughout the world. With the ever increasing supply and consequent cheapness of gold, the world's standard of value, no other result could be possible.

Chart No. 24

Average Annual Consumption, Cost, and Cost of Distributing Tea, Coffee and Sugar in the United States, from 1898 to 1907.

Prepared by Truman G. Palmer, Washington, D. C.





The charts above are based on the reports of the U. S. Bureau of Labor covering retail prices in the United States, 1898 to 1907, since which time the Bureau has not published retail prices; on the figures of the Bureau of Statistics for imports and import prices of tea and coffee, and on the figures of Willett & Gray for the New York wholesale price of sugar.

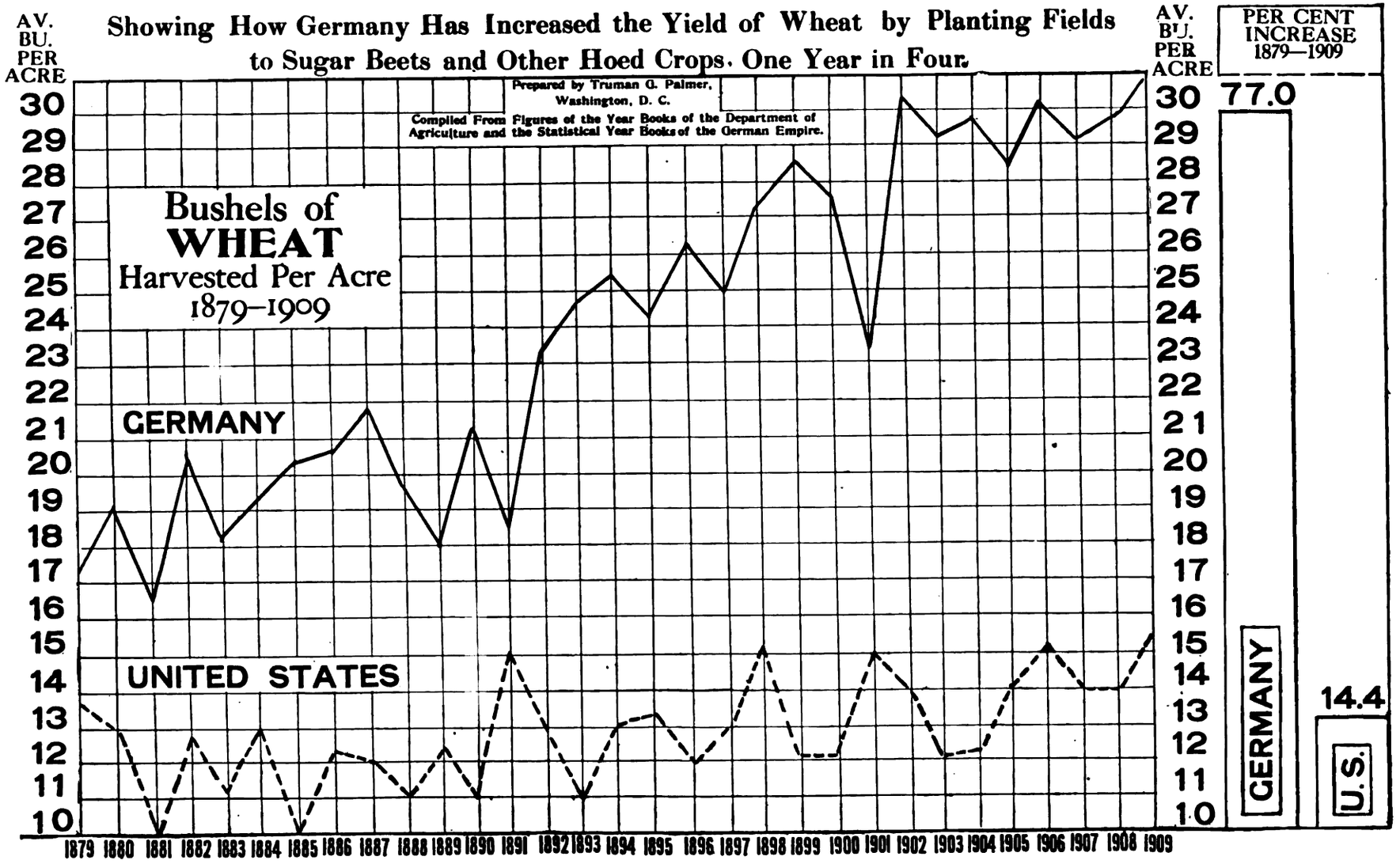
In the case of tea, the "cost of distribution" includes importers', jobbers' and retailers' cost and profit and expense of transportation from the seaboard to points of distribution. In the case of coffee, the "cost of distribution" includes the importers' cost and profit, shrinkage and cost of roasting jobbers' and retailers' cost and profit and expense of transportation from the seaboard to points of distribution. In the case of sugar, the "cost of distribution" includes freight from the refinery to the place of consumption, and the jobbers' and retailers' cost and profit.

It is claimed that the amount charged for the services of the local meat market man for keeping meat in his establishment for several days, cutting it up and delivering it to consumers, equals the combined charge for breeding a calf and ranging it in Texas for two years, transportation to the north, fattening and shipping to slaughter house, slaughtering and freight charges to the retail butcher. Accurate data on this subject are not at hand, and it is doubted if the statement is true, but be that as it may, no complaint can lie against the retailer concerning the margin charged for distributing sugar. The best information is to the effect that no other commodity is handled by either jobbers or retailers on as low a margin as is sugar. The charge for distributing one pound of coffee is equal to the charge for distributing 18 pounds of sugar, and 35 pounds of sugar are handled for the same amount of money that is charged for distributing one pound of tea, although the tea reaches the retailer in the original caddy in which it left the tea gardens of Japan or Ceylon, and the sugar reaches him in the original package in which it left the refinery. The charge for the distribution of sugar affords the consumer no reasonable basis of complaint concerning the high cost of living. As shown elsewhere, while the price of other commodities has increased, both the wholesale and the retail price of sugar has decreased steadily.

Chart No. 25

Agricultural Progress in the United States and Germany

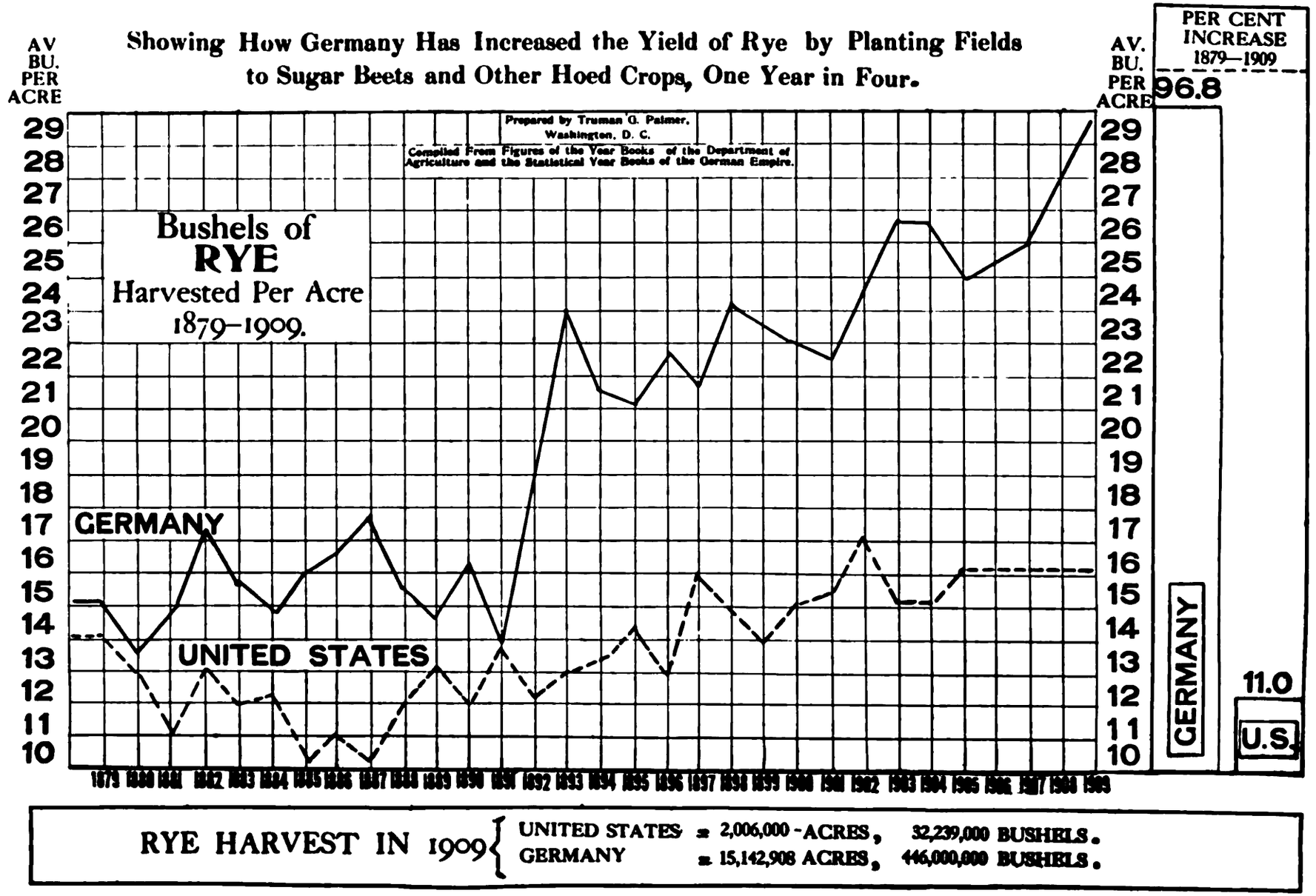
Showing How Germany Has Increased the Yield of Wheat by Planting Fields to Sugar Beets and Other Hoed Crops. One Year in Four.


AV. BU. PER ACRE
30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10
Prepared by Truman G. Palmer, Washington, D. C.
Compiled From Figures of the Year Books of the Department of Agriculture and the Statistical Year Books of the German Empire.
Bushels of WHEAT Harvested Per Acre 1879–1909
GERMANY
UNITED STATES
1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909
AV. BU. PER ACRE
30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10
PER CENT INCREASE 1879—1909
77.0
GERMANY
14.4
U.S.

WHEAT HARVEST IN 1909				
UNITED STATES =	46,723,000	ACRES,	737,189,000	BUSHELS.
GERMANY =	4,523,516	ACRES,	138,000,000	BUSHELS.

Chart No. 26

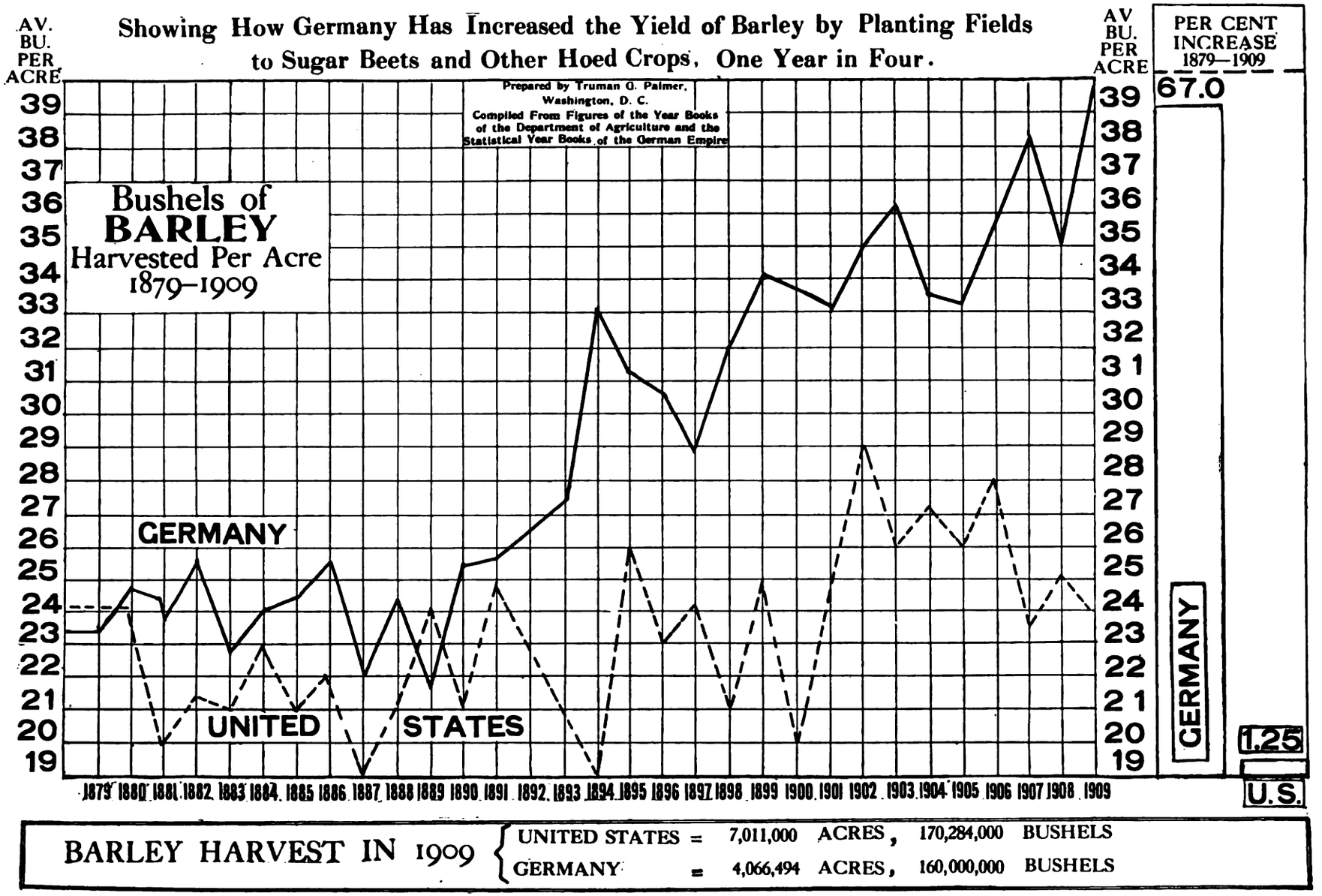
Agricultural Progress in the United States and Germany


Showing How Germany Has Increased the Yield of Rye by Planting Fields to Sugar Beets and Other Hoed Crops, One Year in Four.
AV BU. PER ACRE
AV. BU. PER ACRE
PER CENT INCREASE 1879—1909
96.8
11.0
GERMANY
U.S.
Prepared by Truman G. Palmer, Washington, D. C.
Compiled From Figures of the Year Books of the Department of Agriculture and the Statistical Year Books of the German Empire.
Bushels of RYE Harvested Per Acre 1879–1909.
GERMANY
UNITED STATES
29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10
1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909

RYE HARVEST IN 1909 { UNITED STATES = 2,006,000 ACRES, 32,239,000 BUSHELS. GERMANY = 15,142,908 ACRES, 446,000,000 BUSHELS.

Chart No. 27

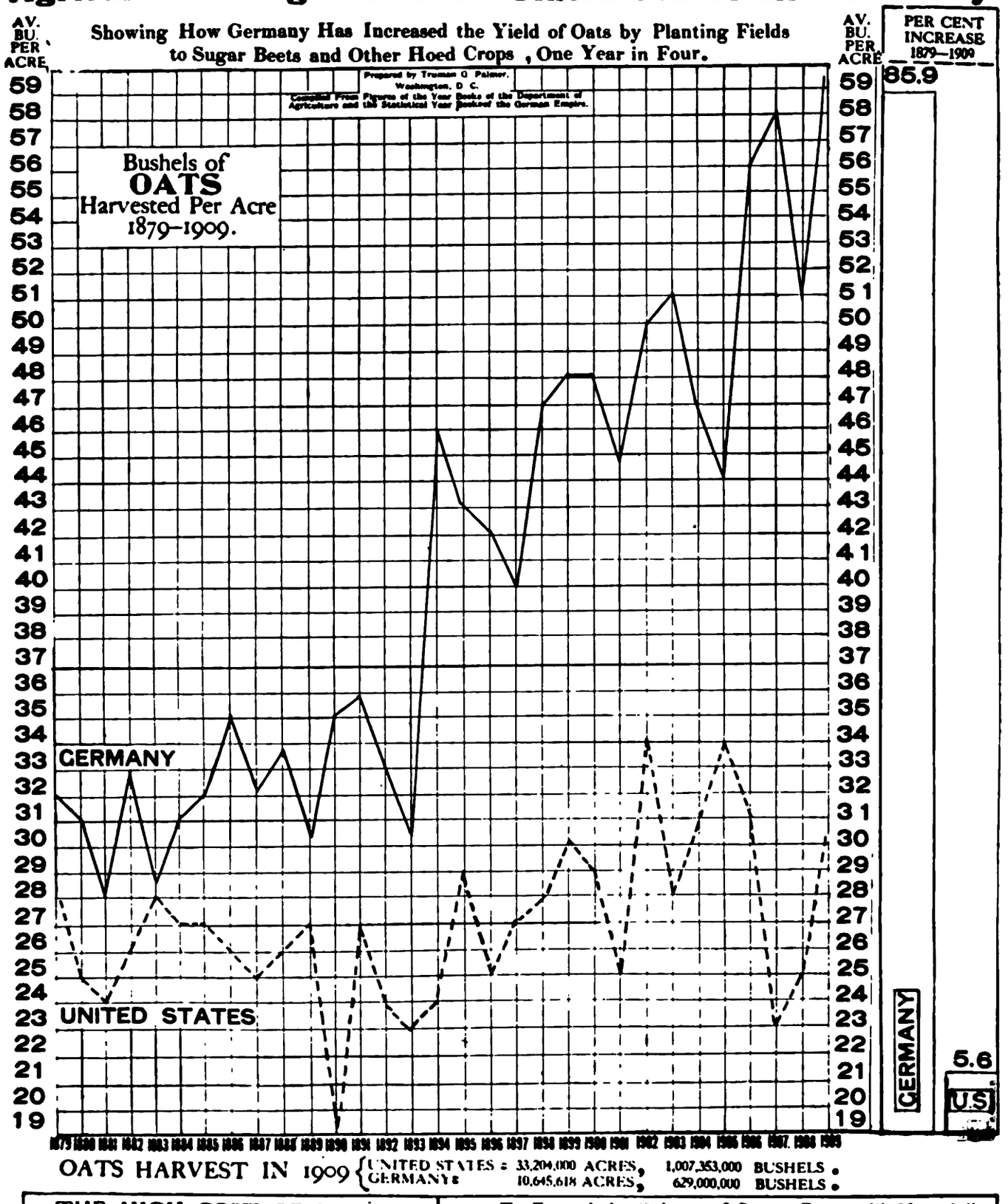
Agricultural Progress in the United States and Germany.


Showing How Germany Has Increased the Yield of Barley by Planting Fields to Sugar Beets and Other Hoed Crops, One Year in Four.
AV. BU. PER ACRE
AV BU. PER ACRE
PER CENT INCREASE 1879—1909
67.0
Prepared by Truman G. Palmer, Washington, D. C.
Compiled From Figures of the Year Books of the Department of Agriculture and the Statistical Year Books of the German Empire
Bushels of BARLEY Harvested Per Acre 1879–1909
GERMANY
UNITED STATES
GERMANY
1.25
U.S.
39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19
1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909

BARLEY HARVEST IN 1909				
UNITED STATES =	7,011,000 ACRES,	170,284,000 BUSHELS
GERMANY =	4,066,494 ACRES,	160,000,000 BUSHELS

Chart No. 28

Agricultural Progress in the United States and Germany


Showing How Germany Has Increased the Yield of Oats by Planting Fields to Sugar Beets and Other Hoed Crops, One Year in Four.
Prepared by Truman G. Palmer, Washington, D. C.
Compiled From Figures of the Year Books of the Department of Agriculture and the Statistical Year Books of the German Empire.
Bushels of OATS Harvested Per Acre 1879–1909.
AV. BU. PER ACRE
GERMANY
UNITED STATES
PER CENT INCREASE 1879—1909
85.9
5.6
GERMANY
U.S.
OATS HARVEST IN 1909 { UNITED STATES = 33,204,000 ACRES, 1,007,353,000 BUSHELS. GERMANY = 10,645,618 ACRES, 629,000,000 BUSHELS.

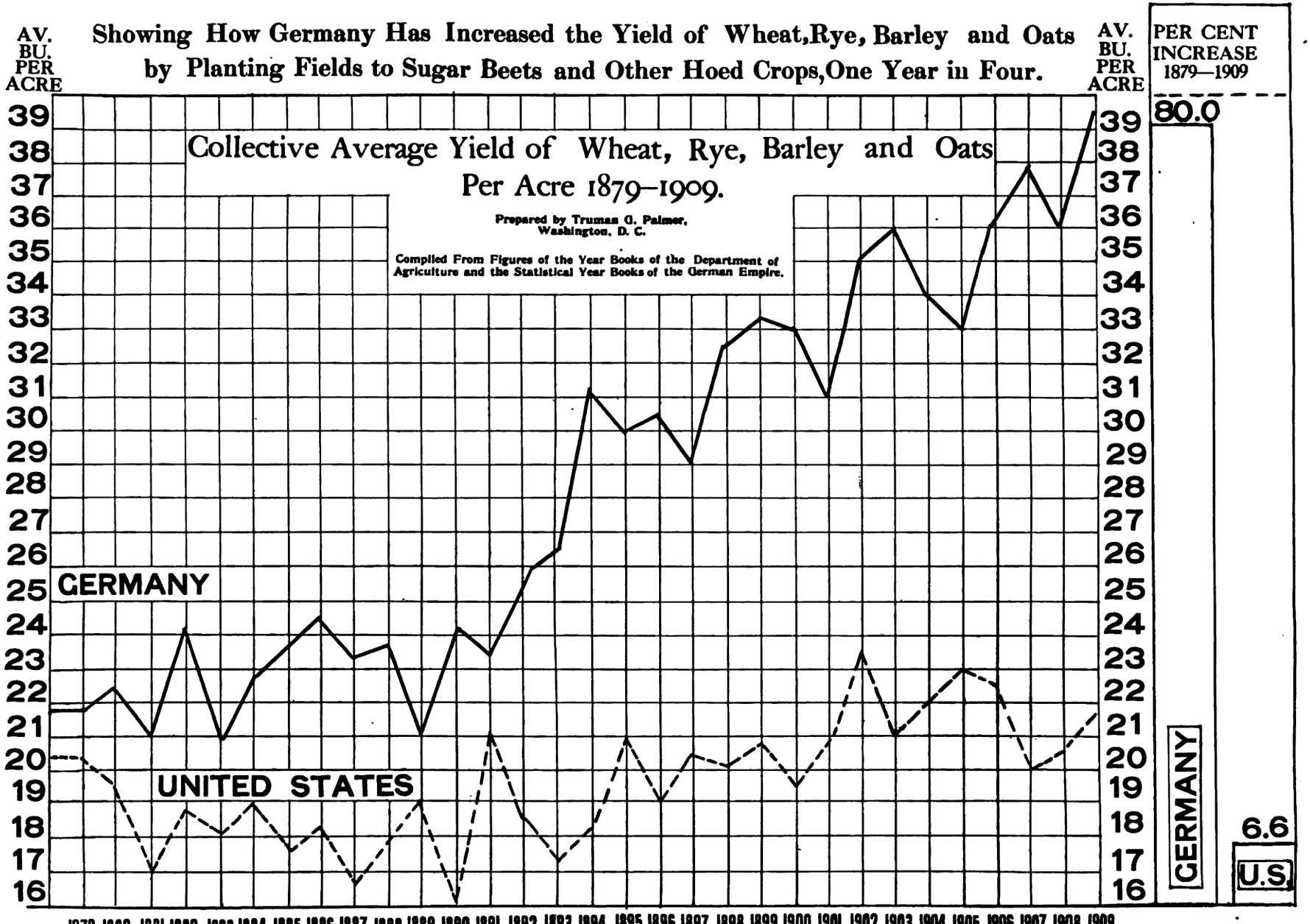
THE HIGH COST OF LIVING: Increasing Production Lowers Prices and Reduces the Cost of Living.

To Extend the Culture of Sugar Beets will Materially Reduce the Cost of Bread and Meat by Increasing the Yield of Cereal Crops and the Stock-carrying Capacity of the Farm.

Chart No. 29

Agricultural Progress in the United States and Germany.

Showing How Germany Has Increased the Yield of Wheat, Rye, Barley and Oats by Planting Fields to Sugar Beets and Other Hoed Crops, One Year in Four.


AV. BU. PER ACRE
AV. BU. PER ACRE
PER CENT INCREASE 1879—1909
Collective Average Yield of Wheat, Rye, Barley and Oats Per Acre 1879–1909.
Prepared by Truman G. Palmer, Washington, D. C.
Compiled From Figures of the Year Books of the Department of Agriculture and the Statistical Year Books of the German Empire.
GERMANY
UNITED STATES
39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16
1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909.
80.0
GERMANY
6.6
U.S.

COMBINED 1909 HARVEST OF WHEAT, RYE BARLEY AND OATS

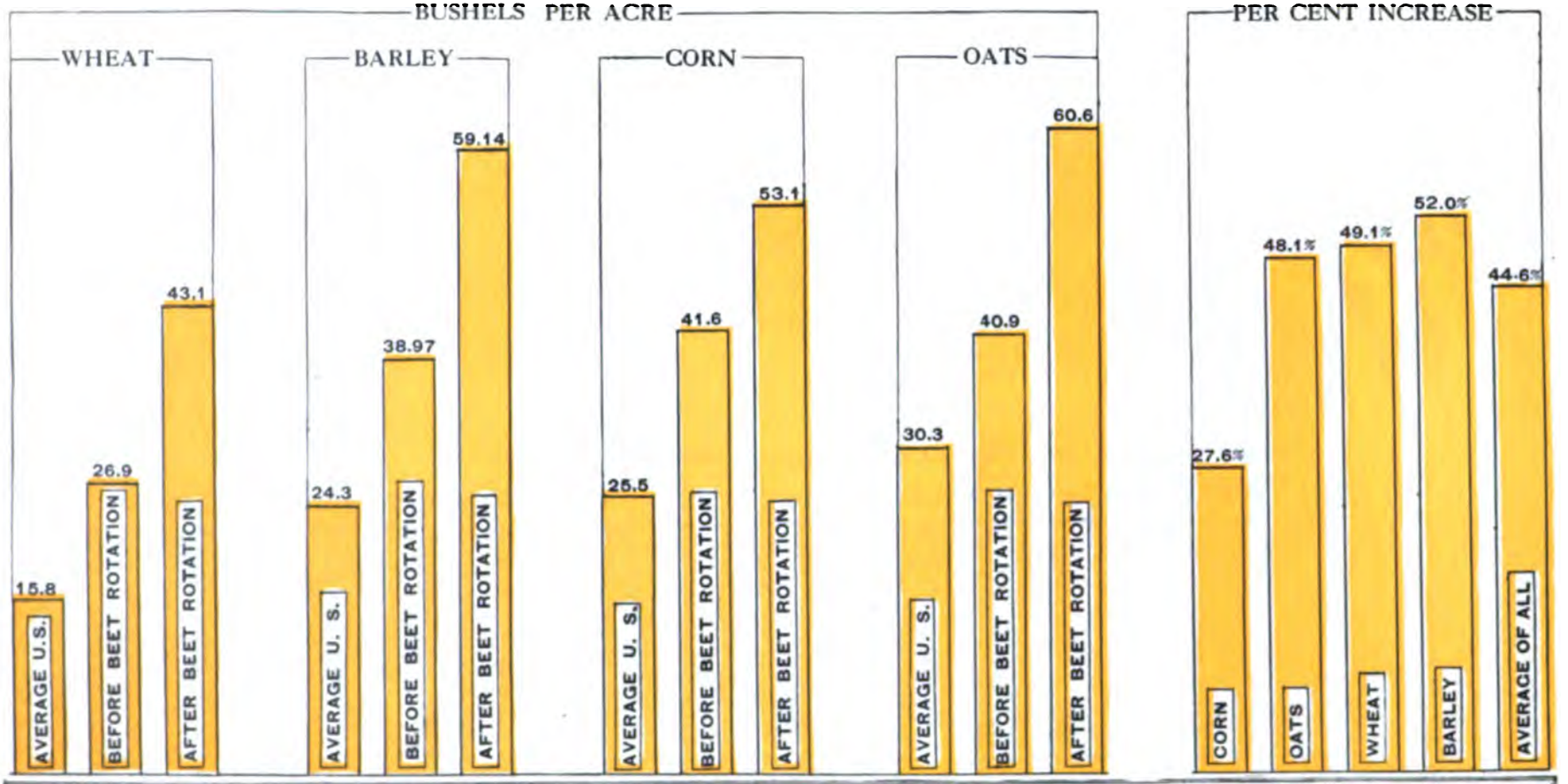
UNITED STATES	=	88,944,000 ACRES,	1,947,065,000 BUSHELS.
GERMANY	=	34,378,536 ACRES,	1,373,000,000 BUSHELS.

Chart No. 30

Agricultural Progress in the Sugar-Beet Districts of the United States.

Showing How American Sugar-Beet Growers Have Increased the Yield of Wheat, Barley, Corn and Oats by Planting Fields to Sugar Beets, One Year in Four.

Prepared by Truman G. Palmer, Washington, D. C.



Of the Several Hundred American Sugar-beet Farmers Reporting to me since 1908, 115 had kept records of their Yields of Cereal Crops Before and After Introducing Sugar Beets in their Crop Rotation, usually Planting the Fields to Sugar Beets One Year in Four.

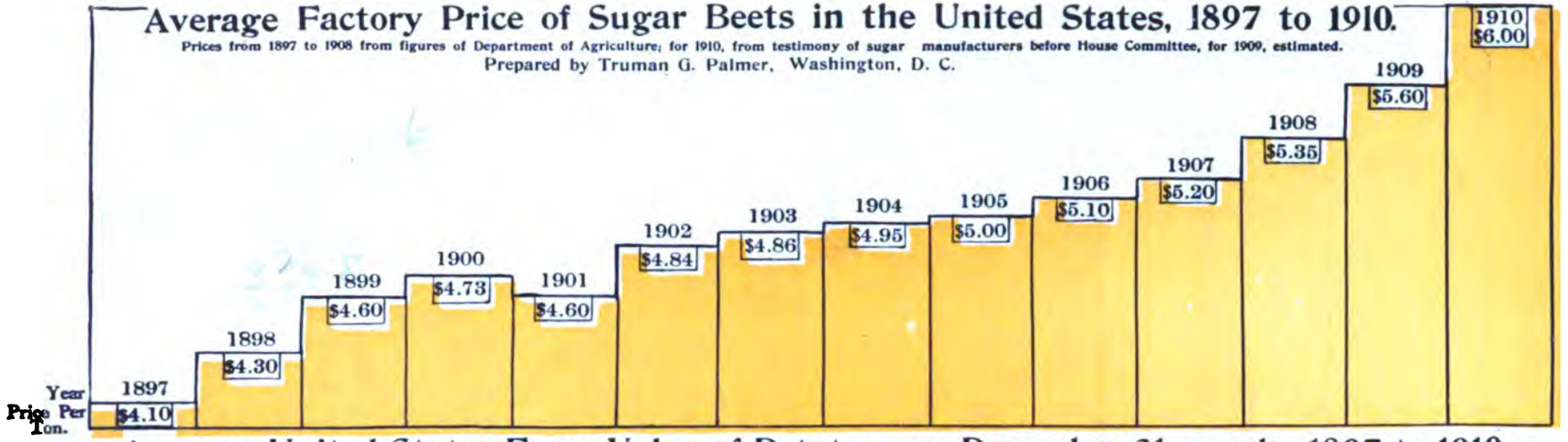
The Chart Shows the Average United States Yield of four Cereal Crops in 1909, the Average Yield of the Same Crops secured by the 115 Farmers Before they had Introduced Sugar-beet Culture, the Average Yield secured by them After Rotating Cereal Crops with Sugar Beets and the Per Cent of Increased Yield Per Acre secured by Reason of having Introduced Sugar-beet Culture. The Farmers Reporting are Not Confined to a Locality or State, but are Scattered through the Various Sugar-beet States from Ohio and Michigan on the East, to California on the West.

Chart No. 31

Average Factory Price of Sugar Beets in the United States, 1897 to 1910.

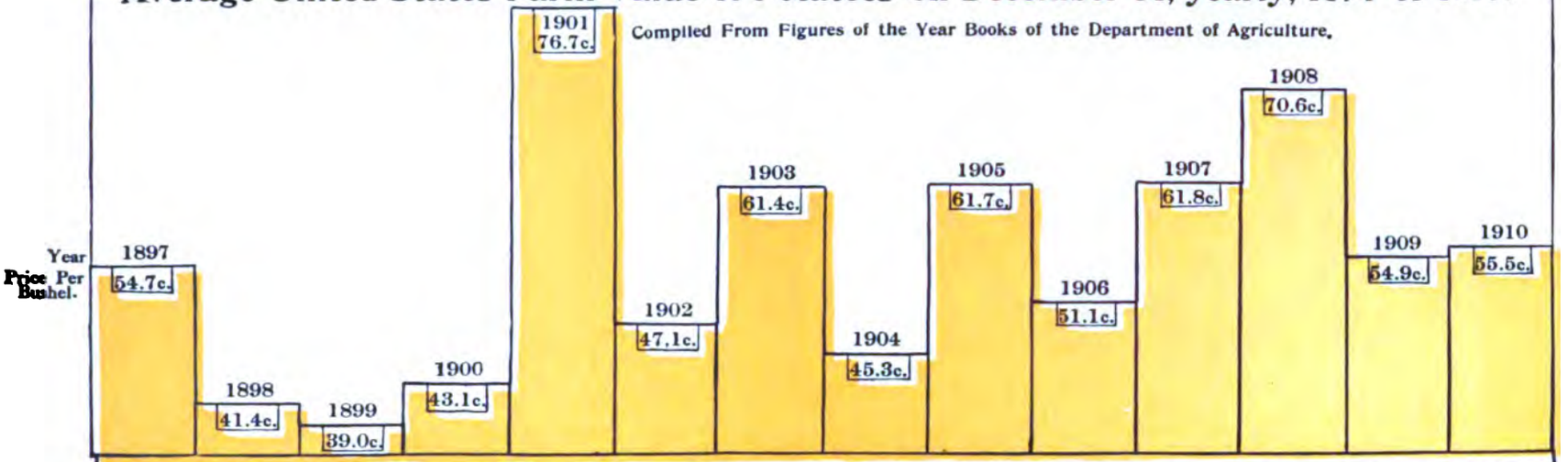
Prices from 1897 to 1908 from figures of Department of Agriculture; for 1910, from testimony of sugar manufacturers before House Committee, for 1909, estimated.

Prepared by Truman G. Palmer, Washington, D. C.



Average United States Farm Value of Potatoes on December 31, yearly, 1897 to 1910.

Compiled From Figures of the Year Books of the Department of Agriculture.



As an aid to the productivity of the soil, potatoes are the only hoed crop grown to any extent in the United States, and it has been suggested that by growing more potatoes in alternation with cereal crops, the yield of the latter thereby would be increased. It undoubtedly is true that if American farmers planted more potatoes, grew them in rotation with cereal crops, and cultivated them as thoroughly as do German farmers, not only would their potato yield per acre be larger than it is in Europe, instead of only one-half the yield, as it is to-day, but their yield of cereal crops grown in rotation with potatoes also would be increased materially. Not such a crop as comes from rotating crops with sugar beets, for the potato is not as deep a rooter and does not leave as many rootlets in the ground to decay and add humus to the soil and besides, it does not insure such perfect preparation and cultivation of the soil. But even with indifferent cultural methods, extending the area of potato culture, would increase somewhat the yield of other crops.

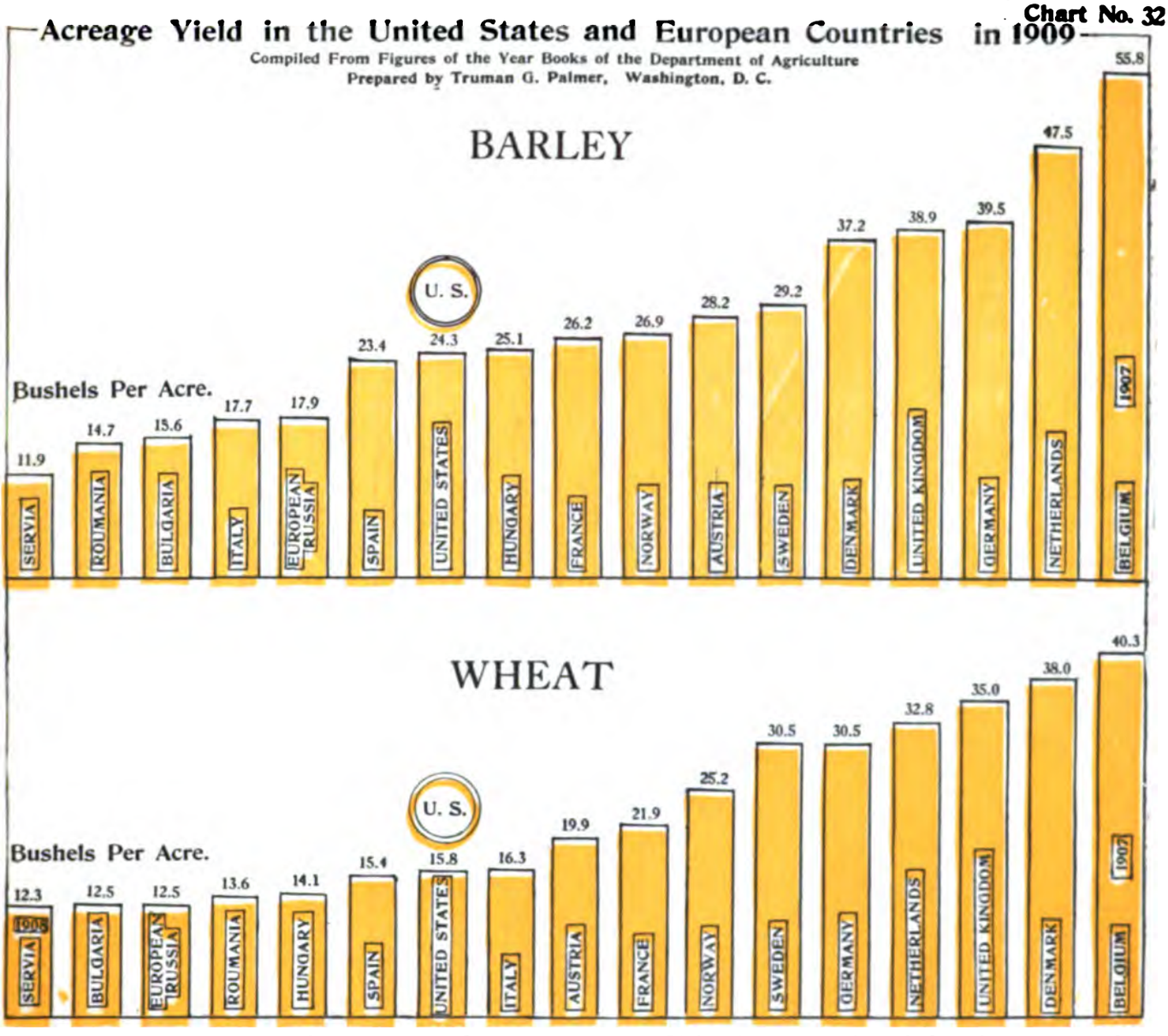
The trouble with increasing the potato crop, however, as a means of increasing the acreage yield of cereals, is the unstable market. As shown by the chart above, the price of potatoes was but one cent more per bushel in 1910 than in 1897, and between these years the price ranged from 39 cents to 76.7 cents per bushel, with an average of 54.6 cents for the 14 years. When the farmers had an abundant yield of potatoes, the price was low, and when they had few potatoes to sell, the price was high. Should American farmers double their potato acreage, the price of potatoes would not pay for the digging, and should they raise 200,000,000 extra bushels, instead of being able to market them at anything like 54 cents or even 50 cents per bushel and thus secure $100,000,000 for their crop, they would rot in the fields for lack of purchasers at any price.

On the other hand, the United States already provides a market for the product of $100,000,000 worth of sugar beets annually and that market is increasing from year to year. With stable tariff conditions insured, soon there would be sufficient beet sugar factories erected to slice $103,000,000 worth more beets annually, and American farmers would be insured of a steady market at remunerative prices, as the sugar produced from that amount of beets only would replace the foreign sugar which the United States now imports.

As will be seen by the chart, the price of sugar beets, with the exception of one year, when Cuban annexation was threatened, has been higher with each succeeding year. Farmers who grow sugar beets take no chances as to fluctuation in price. The factory management fixes in advance the price it will pay per ton of beets, and if the price were not sufficiently alluring, farmers would devote their fields to other crops. Before the farmers prepare their ground, they have a written contract with a responsible company for the sale of their crop at a given price per ton. The factory assumes all risk except that of climatic conditions, and as the sugar beet is hardy and roots deeply, it stands both drought and excessive rainfall better than do most other crops.

By increasing the area now planted to sugar-beets to four times the present acreage, farmers would be sure to win, but to increase materially the area planted to potatoes, they would be sure to lose. American farmers refuse to grow root crops for stock feeding purposes, and increasing their area planted to sugar beets appears to be the only method whereby their acreage yield of cereal crops can be materially increased.

Chart No. 32



In 1853, when the French Emperor and Empress came to Valenciennes, a triumphal arch was erected, which bore the following inscription:

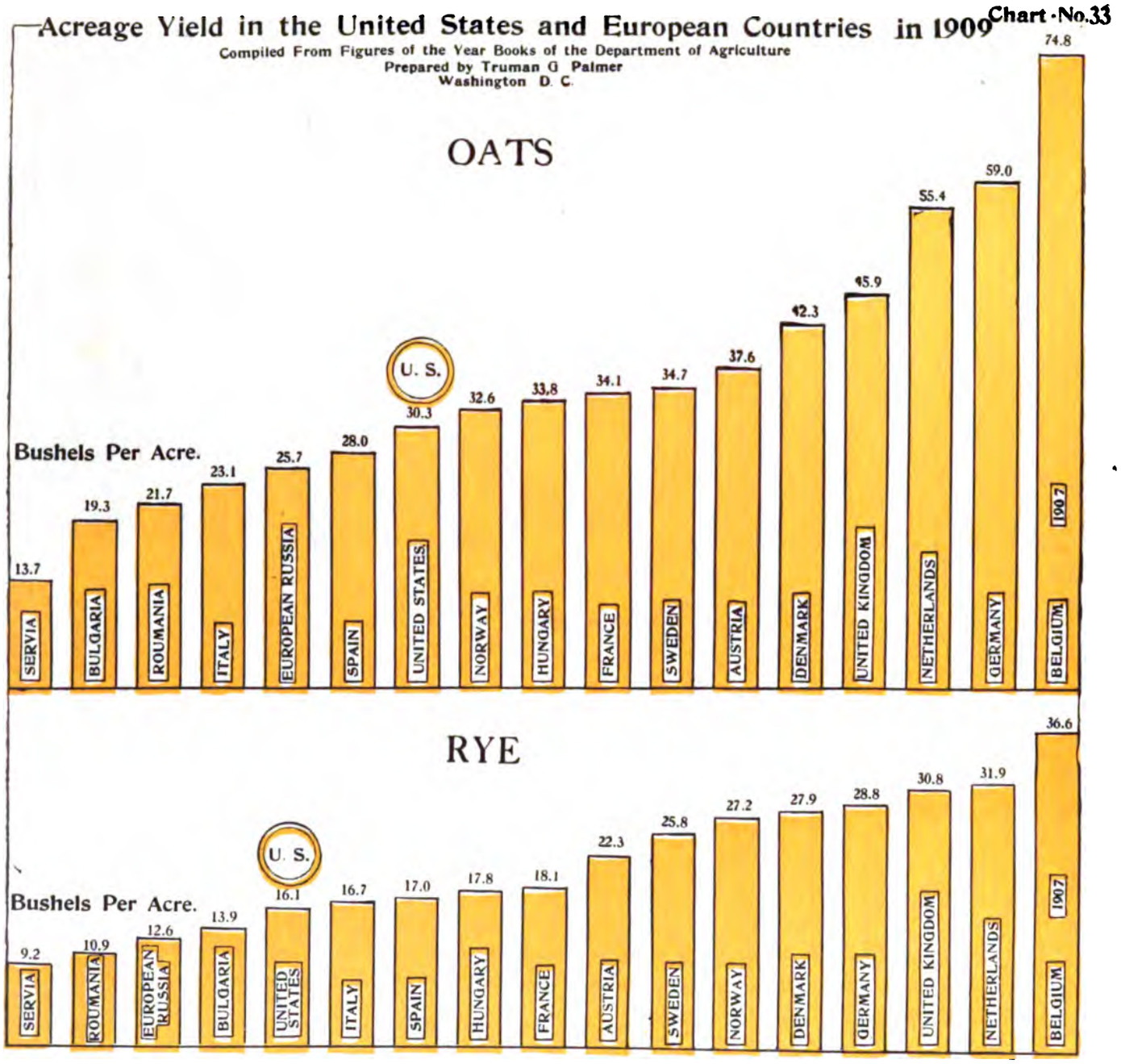
SUGAR MANUFACTURE.

NAPOLEON I, WHO CREATED IT.	NAPOLEON III, WHO PROTECTED IT.
Before the manufacture of beet sugar the arrondissement of Valenciennes produced 695,750 bushels of wheat and fattened 700 oxen.	Since the manufacture of beet sugar was introduced the arrondissement of Valenciennes produces 1,157,750 bushels of wheat and fattens 11,500 oxen.

[Prof. Dr. von Rumker, Professor of Agriculture, University of Breslau (Silesia), Germany, in "Blatter fur Zuckerrubenbau," March 11, 1903.]

"The high yield of cereals and other grains in beet regions dated from the introduction of rational sugar-beet culture."

"Sugar-beet culture is without doubt the direct and indirect cause of the increase of gross and net yields of the entire agriculture and, therefore, also of the soil values in the regions touched. The demonstration of the increase of the total yields of all other field crops due to beet culture and notices on the importance of sugar-beet culture for our agriculture we find stated repeatedly in literature."



NAPOLEON BONAPARTE TO HIS MINISTER OF THE INTERIOR, MARCH 18, 1811.

"The minister will apportion among the different departments 60,000 arpents (90,000 acres) of land, on which it will be necessary to grow beet roots sufficient for the entire consumption of France. * * *

"*The minister will also advise the cultivators that the growing of beet roots improves the soil and that the residue of the fabrication furnishes an excellent food for cattle.*"

Louis Napoleon in "Analyse de la Question des Sucres" (1842) said of the beet sugar industry:

"It retains workmen in the country, and gives them employment in the dullest months of the year; it diffuses among the agricultural classes good methods of culture, calling to their aid industrial science and the arts of practical chemistry and mechanics. It multiplies the centers of labor. It promotes, in consequence, those sound principles upon which rest the organization of society and the security of governments; for the prosperity of a people is the basis of public order. * * * Wherever the beet is cultivated the value of land is enhanced, the wages of workmen are increased, and the general prosperity is promoted."

The same author puts the following words in the mouth of the beet-sugar industry:

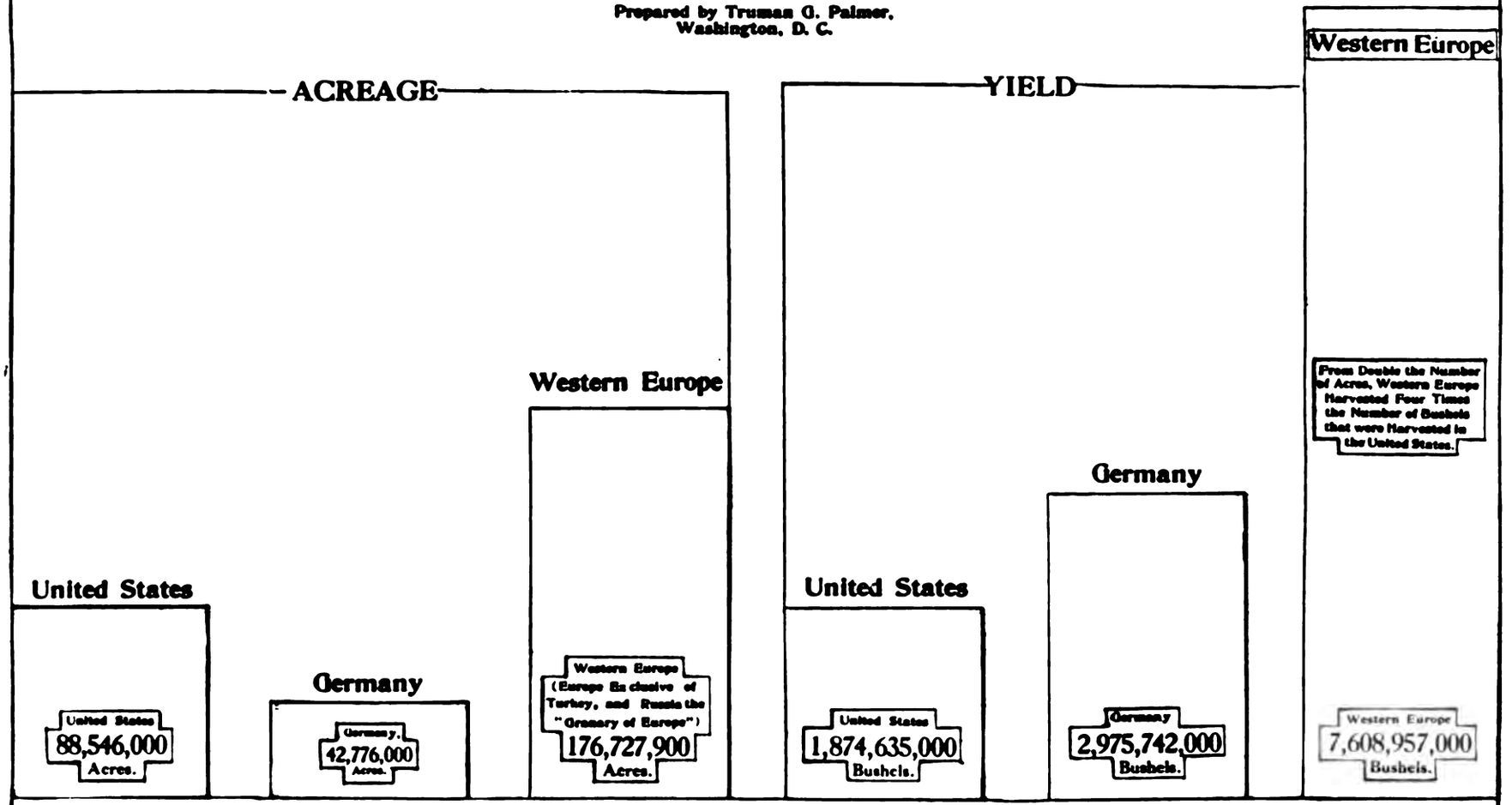
"Respect me for I improve the soil. I make land fertile which, without me, would be uncultivated. I give employment to laborers, who otherwise would be idle. I solve one of the greatest problems of modern society. I organize and elevate labor."

Chart No. 34

COMBINED ACREAGE AND COMBINED YIELD OF WHEAT, RYE, BARLEY, OATS AND POTATOES IN 1907. UNITED STATES, GERMANY, WESTERN EUROPE.

Compiled From Figures of the Year Books of the Department of Agriculture the Statistical Year Books of the German Empire and other Government Publications

Prepared by Truman G. Palmer, Washington, D. C.


ACREAGE
United States
United States 88,546,000 Acres.
Germany
Germany. 42,776,000 Acres.
Western Europe
Western Europe (Europe Exclusive of Turkey, and Russia the "Granary of Europe") 176,727,900 Acres.
YIELD
United States
United States 1,874,635,000 Bushels.
Germany
Germany 2,975,742,000 Bushels.
Western Europe
From Double the Number of Acres, Western Europe Harvested Four Times the Number of Bushels that were Harvested in the United States.
Western Europe 7,608,957,000 Bushels.

As a rule, the farmers of the United States raise no root crops, and as a result they have the doubtful distinction of securing from their fields the minimum yields of cereal crops.

The farmers of Great Britain raise two million acres of root crops (mangolds, swedes, and turnips), in rotation with eight million acres of cereal crops. Their root crop is not a money crop, the roots being fed to stock, and for direct results it is the least profitable crop in the rotation, but it greatly increases the yield of all other crops grown in rotation.

Wherever possible, the farmers of Germany grow sugar beets in rotation with cereal crops. The sugar beet crop is a direct money crop and one of the most profitable in the rotation. After selling the sugar in the beets for cash, the German farmers haul back to the farm in the by-products the full feeding value of their roots, thus securing the maximum benefits to their soil, the direct profit of the crop and the full feeding value as well.

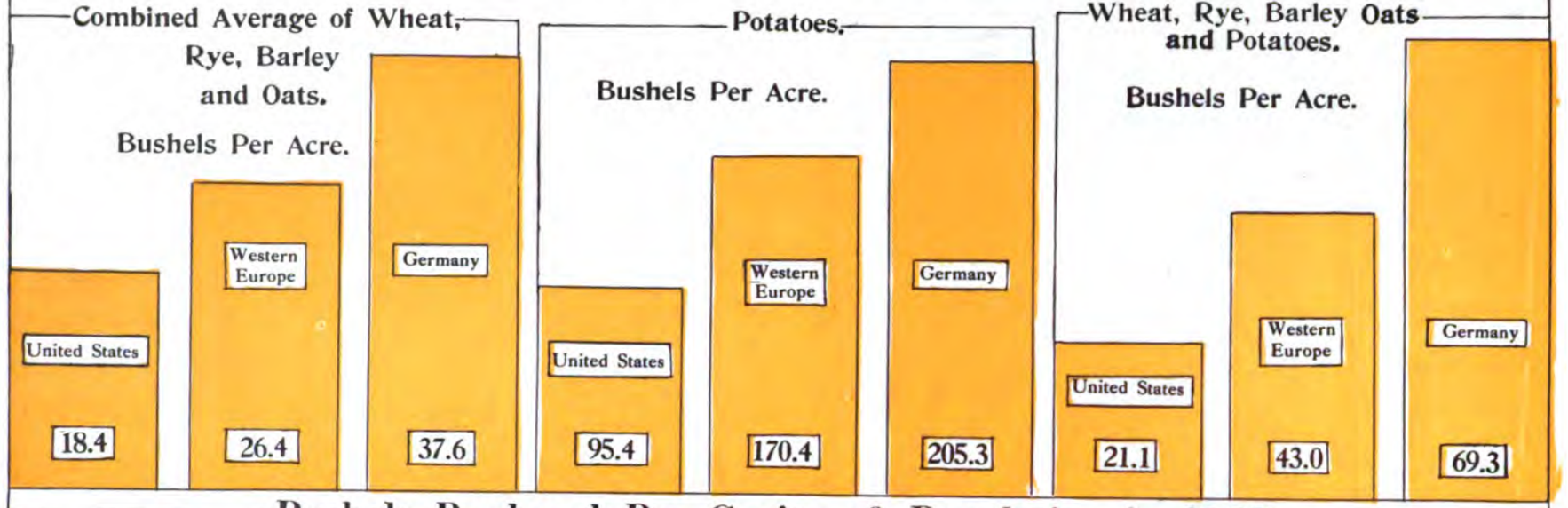
All root crops improve the soil, sugar beets most of all. Sugar beets can be grown at a direct profit, and except gardening, other root crops can not. Like their German cousins, American farmers grow sugar beets wherever there are factories which will purchase them, and thus they greatly increase their yield of all other crops. Unlike their British cousins, American farmers can not be induced to grow, for stock feeding purposes, root crops of low intrinsic value. The only practical way to induce American farmers to grow root crops and thereby double their acreage yields of other crops is to erect new beet sugar factories and furnish them markets for the sale of sugar beets.

A rational system of modern root crop rotation one year in four soon would double the yield of cereal crops in the United States, double the stock-carrying capacity of the farms and check the rise in prices. No other practical system which will accomplish this result is known to agricultural scientists and unless the yield per acre be increased, prices of farm products will continue to advance, and thus will contribute to a still higher cost of living.

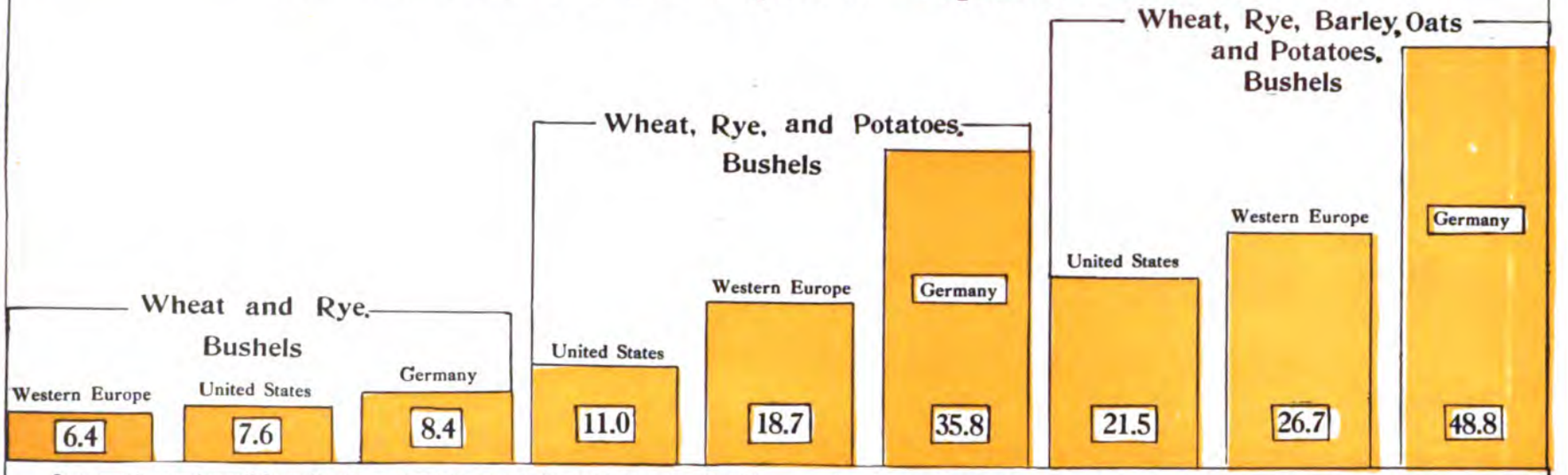
Chart No. 35

Acreage Yield of the United States, Germany and Western Europe in 1907.

Prepared by Truman G. Palmer, Washington, D. C.



Bushels Produced Per Capita of Population in 1907.



In a recent magazine article, under the caption "The United States Feeding the World," a distinguished writer on agricultural topics said that "when the United States exports its cotton to the looms of Western Europe, it sends with it the food stuffs with which to feed their starving hordes of mill workers."

Considering the fact that of the five crops above mentioned, Germany produces 48.8 bushels, and Western Europe 26.7 bushels per capita of population, while the United States produces but 21.7 bushels, the statement that the United States is feeding the starving hordes of Europe would not seem to be justified.

Through the introduction of sugar beet culture, Germany has increased her acreage yield of wheat, rye, barley and oats 80 per cent during the past thirty years, as compared to an increase of 6.6 per cent in the United States for the same crops during the same period. The introduction of this crop also increased the stock-carrying capacity of German farms in like proportion.

To double the yield and stock carrying capacity of American farms would go far toward solving the high cost of living problem.

Chart No. 36

Wheat Acreage and Yield of Minnesota and Germany in 1907.

Compiled From Figures of Government Publications.

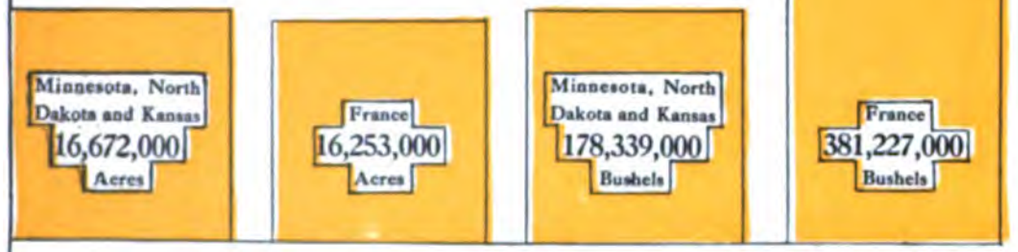
Prepared by Truman G. Palmer, Washington, D. C.

Chart No. 37

Wheat Acreage and Yield in 1907, of France, and of Minnesota, North Dakota and Kansas.

Compiled From Figures of Government Publications.

Prepared by Truman G. Palmer, Washington, D. C.



Minnesota, North Dakota and Kansas are the three greatest wheat producing States of the Union, but that distinction has been attained, not by rational methods of modern agriculture, but by increasing the area planted to wheat. The following figures of the Department of Agriculture, covering the average annual yield in bushels of wheat per acre during ten year periods, tell their own story:

	1866-75	1876-85	1886-95	1896-1905	1906-10
Minnesota	15.0	12.8	13.7	13.3	13.9
North Dakota	Not given	Not given	14.5	12.2	10.6
Kansas	15.7	13.9	12.8	13.7	13.4

The area of France is the same as that of these three States and the area sown to wheat is the same, but while the wheat yield of these States has decreased several bushels per acre, the average yield in France has risen from 14.2 bushels per acre in 1866, to an average of 20.5 bushels during the past ten years. The German yield of wheat has risen from 17.3 bushels in 1879 to an average of 28.9 bushels per acre during the past ten years.

Chart No. 38

Wheat Versus Sugar Beets.

Relative Value of Yield Per Acre.

Prepared by Truman G. Palmer, Washington, D. C.

Wheat.
Area now required on which to produce $100,000,000 worth of wheat to exchange for the $100,000,000 worth of foreign-produced sugar imported into the United States annually.
8,242,227
Acres
Sugar Beets.
Area required on which to produce $100,000,000 worth of sugar.
1,671,421
Acres

These three States possess richer soils, a better agricultural climate, a more well-to-do and more intelligent class of farmers than are to be found either in Germany or France, and should produce more bushels of all crops per acre. But instead, based on U. S. farm values per bushel on December 31, 1910, had the 1910 wheat yield of Kansas and Minnesota and the 1909 yield of North Dakota (the 1910 yield was abnormally low) equaled the yield per acre in Germany for 1910, the excess bushels of wheat produced would have added the following amounts to the wealth of the farmers of the three States:

Minnesota	$74,617,400
North Dakota	96,301,000
Kansas	57,390,600
Total for the three States	$228,309,000

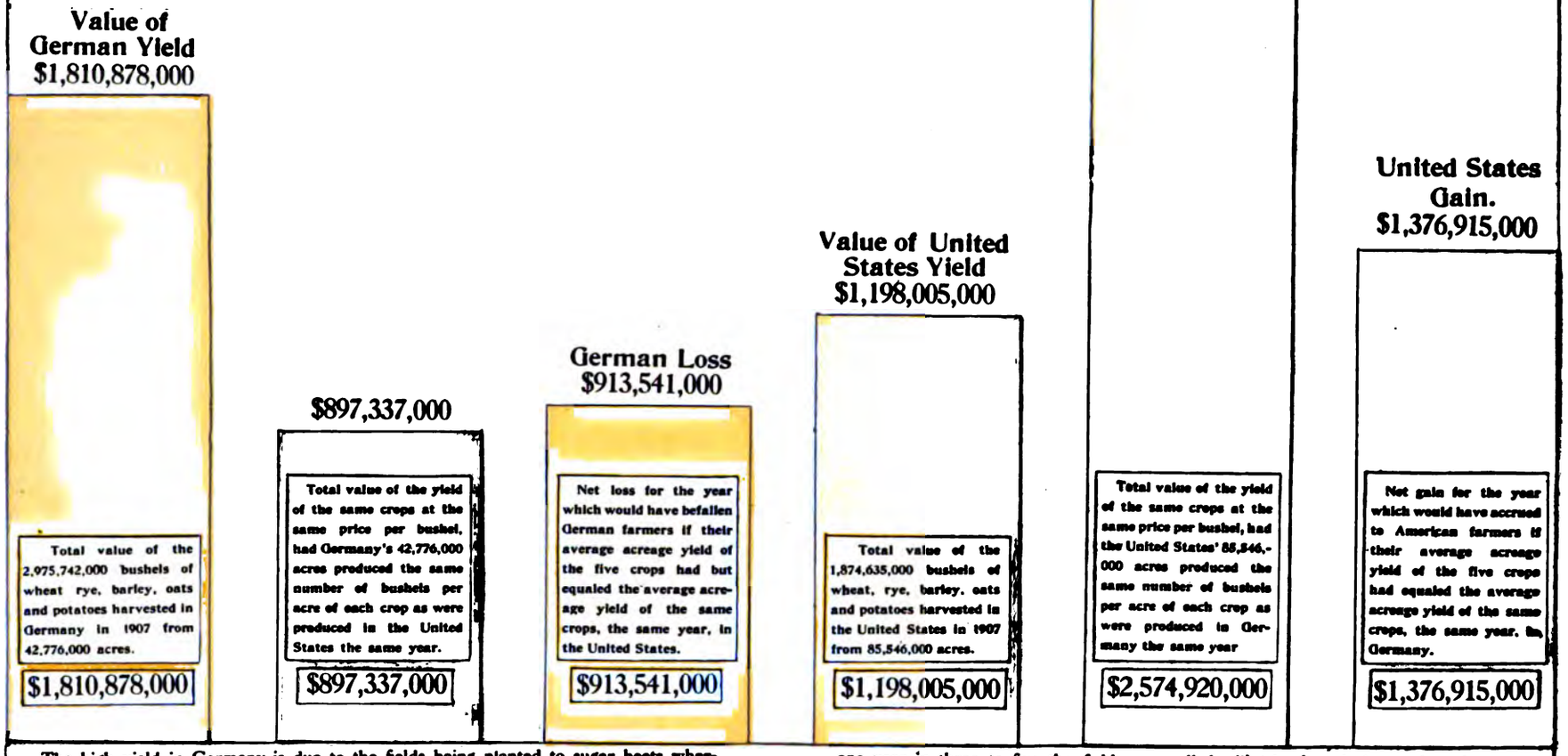
The introduction of sugar-beet culture revolutionized cereal crop yields in Europe, and the reports of 115 American sugar-beet growers show an average yield of 43.1 bushels of wheat per acre when grown in rotation with sugar beets, which is nearly 50 per cent in excess of the present yield in Germany.

Chart No. 39

Annual Loss to Germany and Gain to the United States on Five Crops in 1907 had the Agricultural Methods of the Two Nations Been Reversed.

(Both German and United States Values Per Bushel Based upon United States Farm Values December 31, 1907, as given in the Year Book of the Department of Agriculture)

Prepared by Truman G. Palmer, Washington, D. C.


Value of German Yield
$1,810,878,000
Total value of the 2,975,742,000 bushels of wheat rye, barley, oats and potatoes harvested in Germany in 1907 from 42,776,000 acres.
$1,810,878,000
$897,337,000
Total value of the yield of the same crops at the same price per bushel, had Germany's 42,776,000 acres produced the same number of bushels per acre of each crop as were produced in the United States the same year.
$897,337,000
German Loss
$913,541,000
Net loss for the year which would have befallen German farmers if their average acreage yield of the five crops had but equaled the average acreage yield of the same crops, the same year, in the United States.
$913,541,000
Value of United States Yield
$1,198,005,000
Total value of the 1,874,635,000 bushels of wheat, rye, barley, oats and potatoes harvested in the United States in 1907 from 85,546,000 acres.
$1,198,005,000
$2,574,920,000
Total value of the yield of the same crops at the same price per bushel, had the United States' 85,546,000 acres produced the same number of bushels per acre of each crop as were produced in Germany the same year
$2,574,920,000
United States Gain.
$1,376,915,000
Net gain for the year which would have accrued to American farmers if their average acreage yield of the five crops had equaled the average acreage yield of the same crops, the same year, in Germany.
$1,376,915,000

The high yield in Germany is due to the fields being planted to sugar beets wherever possible, and if not to sugar beets, to other root crops, usually, one year in four.

Except in the sugar beet districts of the United States, root crops rarely are planted. In the sugar beet districts where the fields are planted to sugar beets one year in four, the average yield of cereal crops, as reported direct to me by farmers, exceeds the average yield in Germany and exceeds by 133 per cent the average yield in the United States, while the yield of potatoes is more than double the average yield in the United States and exceeds the German yield by 20 bushels per acre.

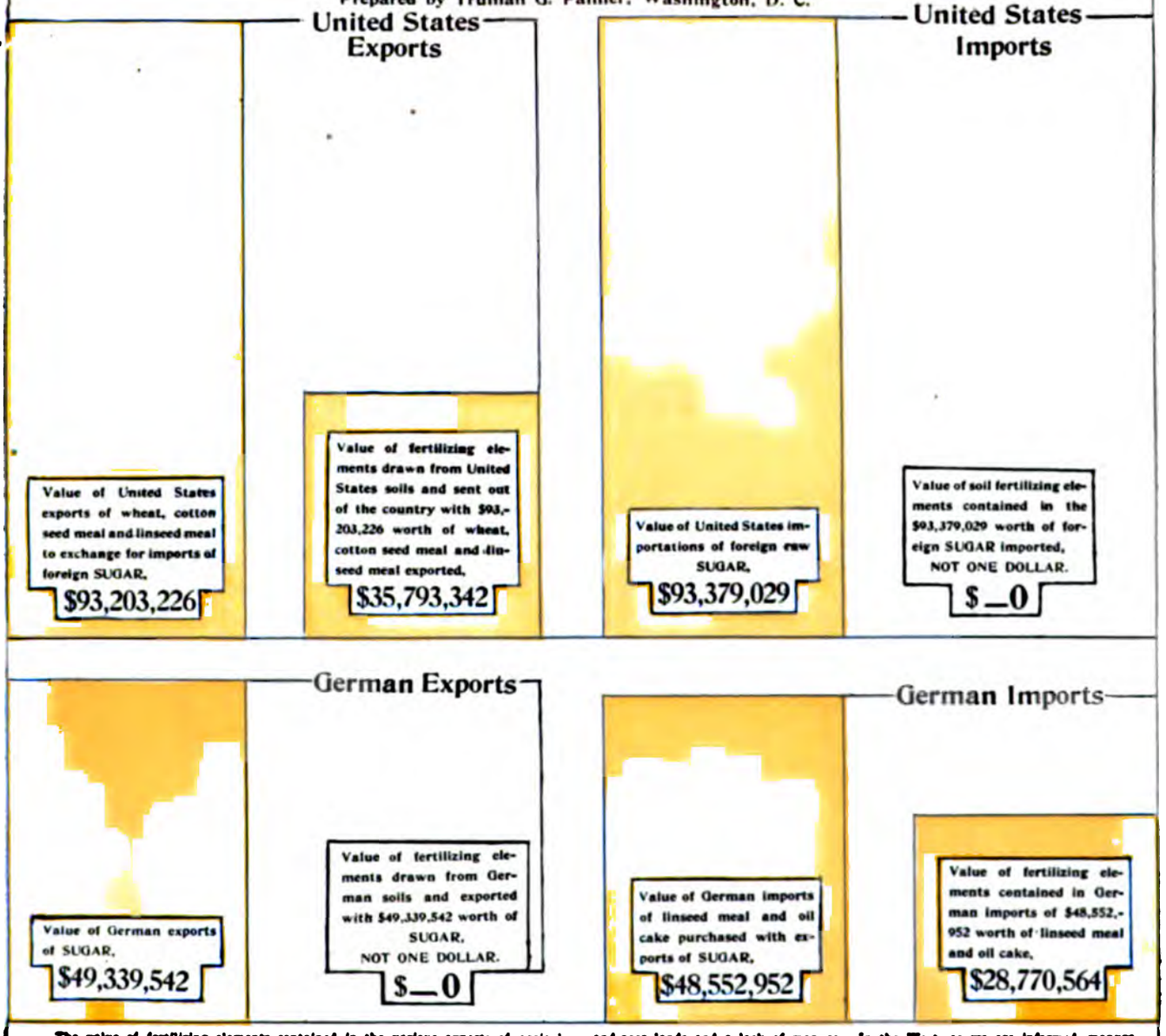
"Intensive Farming" is not shrouded in mystery, nor does it require scientific knowledge or continuous laborious application. As practiced in Europe, it means that one year in three to five the fields are well fertilized, plowed deep, planted to sugar beets or other root crops, well cultivated and hoed to facilitate the growth of the roots and to kill the weeds. During the remaining three years, the fields are plowed, sown to grain and the harvest gathered, the same as in the United States. Any farmer can practice "Intensive Farming" and all farmers would practice it if they but knew the wealth it would bring them.

Aside from the fact that the culture of sugar beets improves the soil more than does the culture of other root crops, they are the most profitable crop the farmer can grow, while a root crop grown for stock-feeding purposes is the least profitable of any in the rotation.

Chart No. 40

Soil Fertility of the United States and Germany as affected in 1909 by the Principles of National Economy adopted by the Two Nations in Regard to Sugar.

Prepared by Truman G. Palmer, Washington, D. C.


United States Exports
Value of United States exports of wheat, cotton seed meal and linseed meal to exchange for imports of foreign SUGAR,
$93,203,226
Value of fertilizing elements drawn from United States soils and sent out of the country with $93,203,226 worth of wheat, cotton seed meal and linseed meal exported,
$35,793,342
United States Imports
Value of United States importations of foreign raw SUGAR,
$93,379,029
Value of soil fertilizing elements contained in the $93,379,029 worth of foreign SUGAR imported,
NOT ONE DOLLAR.
$—0
German Exports
Value of German exports of SUGAR,
$49,339,542
Value of fertilizing elements drawn from German soils and exported with $49,339,542 worth of SUGAR,
NOT ONE DOLLAR.
$—0
German Imports
Value of German imports of linseed meal and oil cake purchased with exports of SUGAR,
$48,552,952
Value of fertilizing elements contained in German imports of $48,552,952 worth of linseed meal and oil cake,
$28,770,564

The value of fertilizing elements contained in the various exports of agricultural products of the United States is based on figures supplied by the U. S. Department of Agriculture, covering quantities and values of potash, phosphoric acid and nitrogen removed from the soil by the various products exported. In 1909 the United States exported cotton-seed meal to the value of $15,805,433, and it took from the soil and carried with it $14,909,868 worth of fertilizing elements. It was sold at its stock-feeding value, regardless of the fertilizing elements which it contained. After securing from it a profit as an animal food, foreign feeders reaped an additional profit nearly equal to its entire cost, in the insoluble fertilizing chemicals which passed through their stock and was spread on their fields. In eleven items of export in 1909, valued at $179,526,769, the United States robbed its soils of $50,555,759 worth of fertilizing elements and in eight articles of import, costing $305,401,602, Germany brought to her soils $92,204,093 worth of commercial fertilizers.

Germany exports sugar, which comes wholly from the atmosphere and carries no fertilizing elements, in order to pay for products from the United States, the fertilizing elements of which are worth from one-third to one-half their total value.

In 1837 David Lee Child, of Northampton, Mass., wrote:

"It is supposed that the soil of the West is peculiarly adapted to the sugar beet * * * but we doubt whether any part of our territory is destined to be more benefited by it than the New England and other States, which have hard and poor lands and a lack of manure. In the West, as we are informed, manure is not an object of importance to the farmer except as creating a nuisance and causing expense and trouble to move it out of the way. Hay, we have heard that farmers in that region often abandon their log barns and build new ones rather than remove the manure to the gulleys, but in New England manure is the life and soul of agriculture. If the beet-sugar business can boast of any advantage more particularly preeminent, it is the multiplication and improvement of live stock and manure."

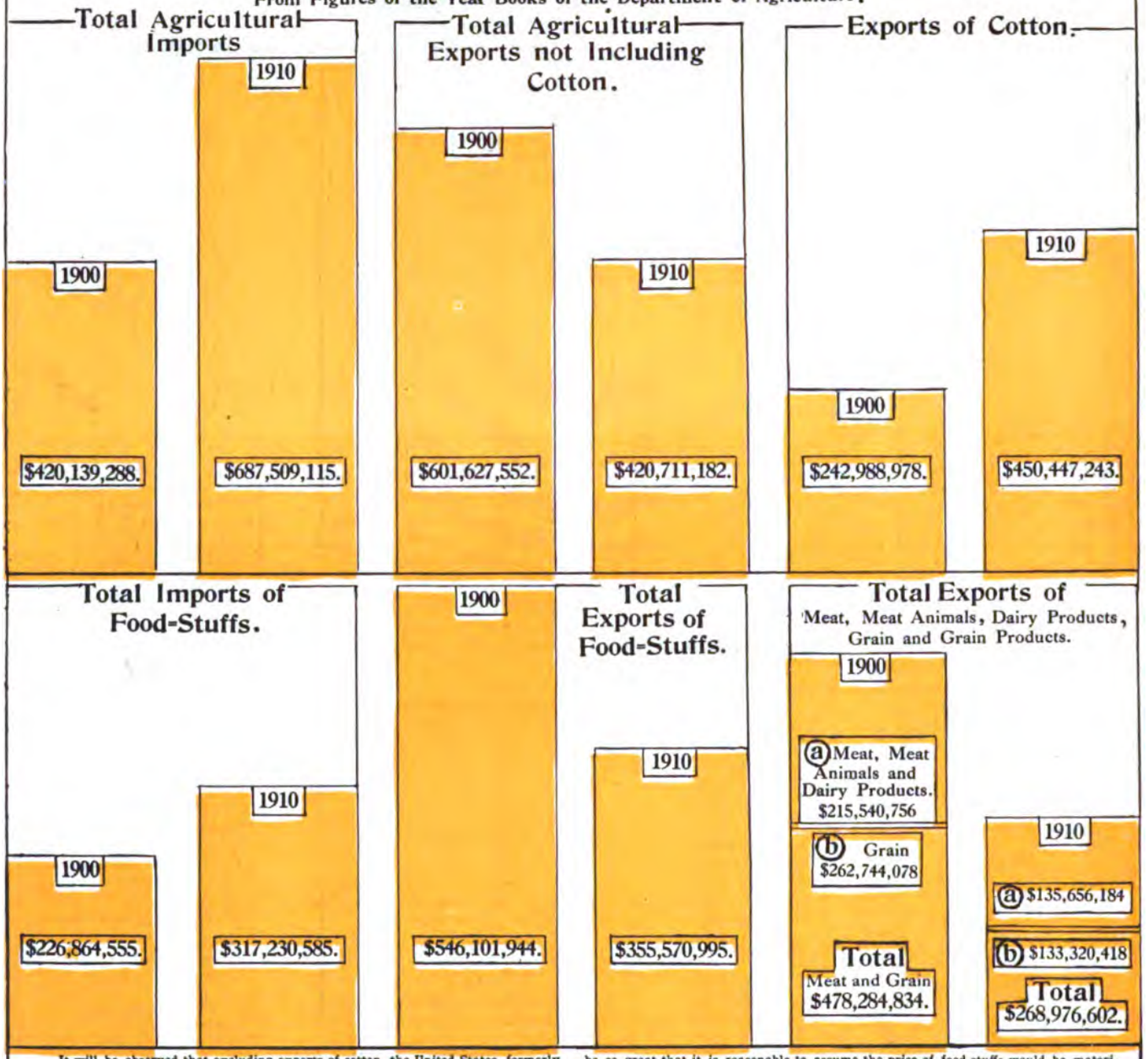
A comparison of the meager crop yields from the richer soils of the West, with the abundant yield from the poorer soils of New England shows that Child had followers who profited by his advice. A few years ago millions of tons of sugar-beet pulp were rotting about western beet-sugar factories because the farmers would not haul it away as a gift. To-day the factories are drying it and what is not consumed at home finds a ready sale in Europe at $25.00 to $30.00 a ton for stock-feeding purposes, where its value long since has been known and appreciated.

That a farmer should prefer to till five acres, in order to raise 70 bushels of wheat to exchange for the sugar which could be produced from one acre, and by so doing rob his soil of fertilizing elements to the value of $14.91, while by cultivating one acre of sugar beets in rotation with four acres of other crops he would double the yield of the five acres, can be accounted for only on the theory of lack of knowledge of these facts.

Chart No. 41

Value of Agricultural Imports and Exports of the United States, 1900 and 1910.

Prepared by Truman G. Palmer, Washington, D. C.
From Figures of the Year Books of the Department of Agriculture.



It will be observed that excluding exports of cotton, the United States, formerly a heavy exporter, has become an importer of agricultural products. From 1900 to 1910, the balance of trade in our favor of $181,488,264 not only has vanished, but an adverse trade balance of $266,797,933 has taken its place, making a difference of $448,286,197 in trade balances in ten years. Cotton exports alone enable the United States to show a favorable trade balance in agricultural products.

It also will be noted that the exports of food-stuffs have declined from $546,101,944 in 1900, to $355,570,995 in 1910, a decrease of nearly $200,000,000 in ten years, and our food-stuff exports now exceed our food-stuff imports by less than $40,000,000 a year. Deducting our exports of hogs and hog products, which have declined from $112,000,000 in 1900 to $85,000,000 in 1910, our imports of food products exceed our exports of food products by $50,000,000 a year. Producing our sugar at home would reduce our agricultural imports by $100,000,000 a year.

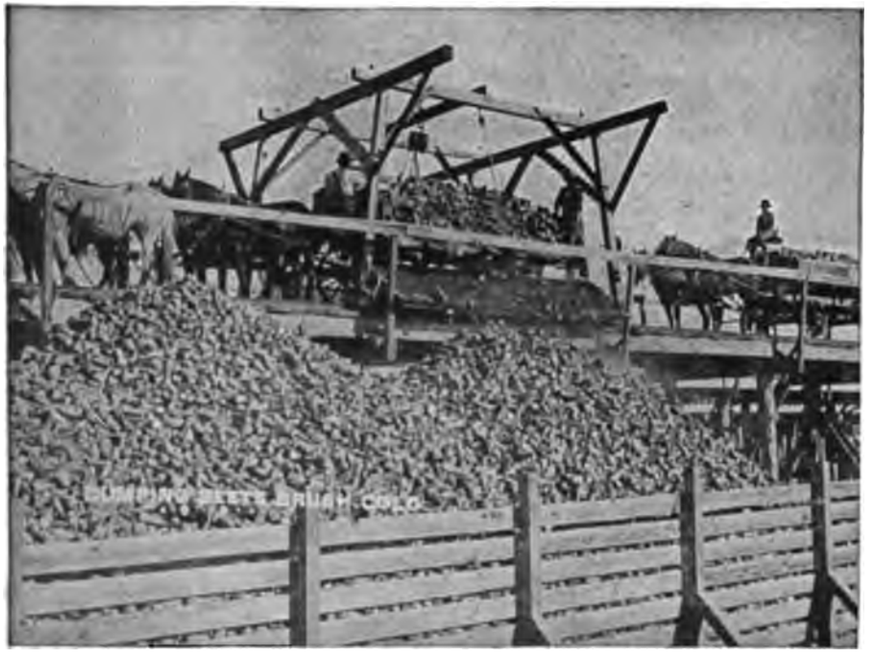
In reversing trade balances in agricultural products other than cotton, it would not have been surprising if our prices of food-stuffs had shown an advance far exceeding the advance in other countries. As shown by another chart, had the United States kept pace with Germany in increasing its yield per acre during the past thirty years, the excess yield over our present yield of wheat, rye, barley and oats harvested from the present area sown to these crops in the United States, would, at prevailing farm prices, add $1,376,915,000 a year to the nation's wealth and our exports would be so great that it is reasonable to assume the price of food-stuffs would be materially lower.

It also is reasonable to assume that had not European nations doubled their crop yields per acre and the stock carrying capacity of their farms through introducing sugar-beet culture and had made no more agricultural progress than has the United States, wheat to-day would be worth $3.00 a bushel and beef a dollar a pound. What Europe has accomplished with her worn-out soils can be accomplished by the same method with the virgin soils of the United States; in fact, it has been proven that by growing sugar beets on United States soils one year in four, the yield of wheat is increased to an average of 43.1 bushels per acre, or nearly 50 per cent more than the phenomenal yield of Germany, and three times the present average yield in the United States.

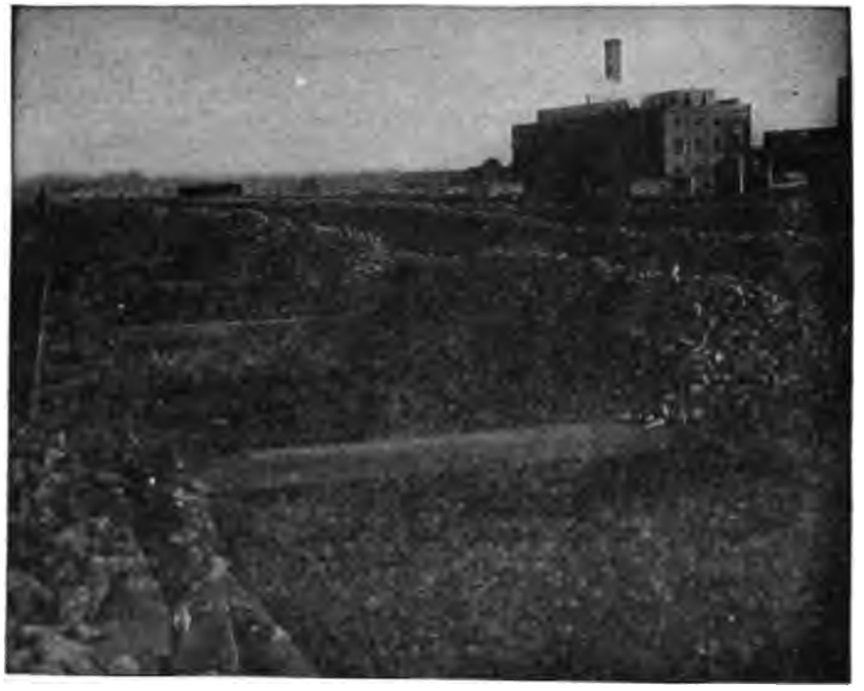
If Germany with her cheap labor and producing 30 bushels of wheat per acre, and the United States with labor at three and four times the cost in Germany and producing 14 to 15 bushels per acre, both were producing for export, and competing for the world market, it does not take a mathematician to figure out which country would capture the trade. Other ways than the growing of hoed root crops in alternation with cereal crops may be discovered whereby a greatly increased yield per acre could be secured, but with the present development of agricultural science, no other method is known.

PILED BEETS, SCOTTSBLUFF BEET DUMP, SCOTTSBLUFF, NEBRASKA.
(Taken October 18, 1911.)

DELIVERING BEETS, BETTERAVIA, CALIFORNIA.



RECEIVING BEETS AT THE BRUSH FACTORY.



20,000 TONS OF SUGAR BEETS PILED UP IN FRONT OF COLORADO FACTORY.

BEET-SUGAR FACTORY AT OXNARD, CALIFORNIA

Slicing capacity, 3,000 tons of beets per day; 300,000 tons per season. In one season has paid $1,800,000 to farmers for beets; $500,000 to employees; $700,000 to railroads; $125,000 for fuel; $75,000 for lime-rock; $25,000 for coke; $250,000 for other supplies. Since its erection in 1898 has paid out $15,000,000 to farmers; $5,000,000 for labor; $4,000,000 for supplies; and $6,000,000 to railroads.

SUGAR AWAITING SHIPMENT AT THE FACTORY.

CATTLE FEEDING ON BEET PULP, BETTERAVIA, CALIFORNIA.

SUGAR-BEET PULP.

For a century the high feeding value of sugar-beet pulp has been recognized in Europe, but until a few years ago millions of tons of this valuable by-product rotted about American beet-sugar factories, because American farmers could not be made to believe it possessed of sufficient value to pay for hauling back to the farm. To secure any return for it many American factories have been compelled to install expensive drying plants and now such portion as American farmers fail to use is shipped to Europe where it commands from $25 to $30 per ton.

NATIONAL ENACTMENTS THE BAROMETER OF BEET-SUGAR DEVELOPMENT.

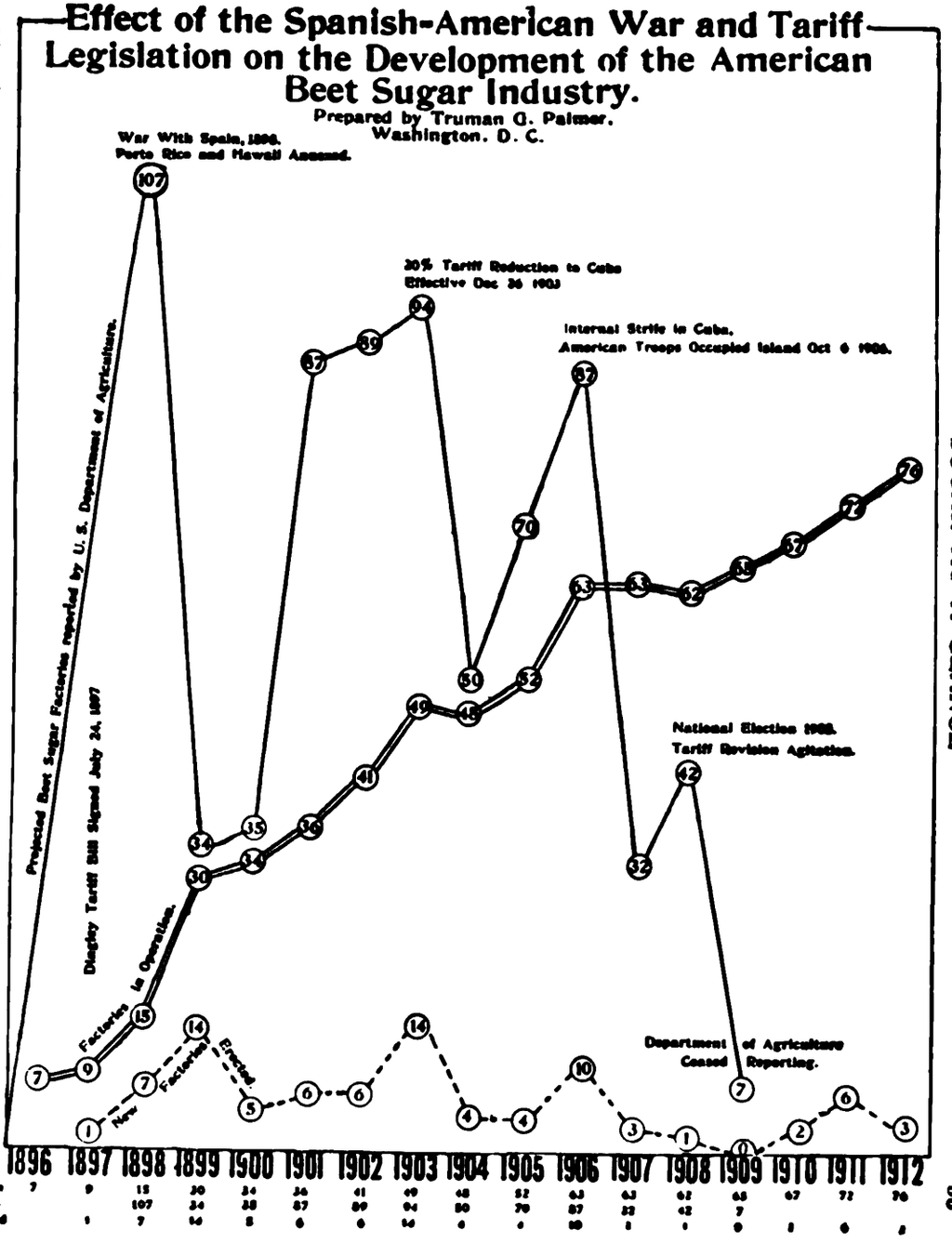
The accompanying chart shows how real or anticipated legislation and the trend of national events affect the investment of capital in the expansion of the domestic beet-sugar industry. When the Dingley Tariff Bill was passed in 1897, it appeared that the United States soon would produce all the sugar its people consume. The bill provided encouragement for the expansion of the industry and the following year, seven new beet-sugar factories were erected, fourteen others were decided upon, to be completed in 1899 and 107 new projected plants were noted by the Department of Agriculture review of the industry. Any reasonably good farming community that offered contracts for from 1,000 to 2,000 acres of beets could secure the erection of a $500,000 or $1,000,000 plant, and the erection of these mammoth structures far outran the beet acreage necessary to operate them to capacity. It was a new crop and farmers were apathetic, but investors were not discouraged.

Then came the war with Spain and the annexation of sugar-producing islands, to be followed five years later by the blight of Cuban reciprocity. Capitalists who were preparing to embark in the industry, believing that the future was secure, paused, then turned their money and their energies to other avenues of endeavor. Of the 86 projected beet-sugar plants to cost $49,000,000, as reported by the Department of Agriculture at the beginning of the agitation for Cuban reciprocity, all but eight were abandoned, these being too far along to be given up.

Prior to Cuban reciprocity, even while the technique of the industry was but little understood, capital erected 43 mammoth plants in six years, and during the nine years following Cuban reciprocity, capital has been induced to embark in the erection of but 27 new plants.

Conditions have been reversed. The apathy of the farmers has been transferred to the capitalists, and the enthusiasm of capitalists has been transferred to the farmers, who have increased their sowings of sugar beets to half a million acres and vainly are seeking to enlist more capital. For several years past, where farmers in excellent farming localities have signed up 5,000 to 7,000 acres for five years, they have been and still are unable to secure the erection of factories to consume the product they are anxious to grow, and probably will continue to fail until by its acts the Congress of the United States indicates whether the national policy is to be to produce our sugar at home, or to turn the present beet-sugar factories into scrap piles.

Chart No. 42


Effect of the Spanish-American War and Tariff Legislation on the Development of the American Beet Sugar Industry.
Prepared by Truman G. Palmer. Washington, D. C.
War With Spain, 1898. Porto Rico and Hawaii Annexed.
20% Tariff Reduction to Cuba Effective Dec 26 1903
Internal Strife in Cuba. American Troops Occupied Island Oct 6 1906.
National Election 1908. Tariff Revision Agitation.
Department of Agriculture Ceased Reporting.
Projected Beet Sugar Factories reported by U. S. Department of Agriculture.
Dingley Tariff Bill Signed July 24, 1897
Factories in Operation.
New Factory Projects
New Factories Erected
1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912
Factories in Operation 7 9 15 30 34 36 41 49 48 52 63 63 62 65 67 72 76
New Factory Projects 107 34 58 87 89 94 80 70 87 52 42 7
New Factories Erected 1 7 14 5 6 6 14 4 4 10 3 1 0 2 6 3

The Blighting Effect of Cuban Reciprocity on the Development of the American Beet-Sugar Industry.

[From progress of the beet-sugar industry in the United States in 1901. Department of Agriculture. Report of Special Agent Charles F. Saylor.]

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SPECIAL AGENT,
Washington, D. C., March 17, 1902.

SIR: I submit herewith, for your inspection and approval, my report for 1901 as special agent for the investigation of the sugar industry. It includes the results of my own observations and investigations, and a considerable mass of information pertinent to the subject collected from various reliable sources.

CHARLES F. SAYLOR, *Special Agent.*

HON. JAMES WILSON,
Secretary of Agriculture.

PROPOSED NEW FACTORIES.

Below is given a list showing location, daily capacity, and estimated cost of construction and equipment of the beet-sugar projects now under contemplation. These projects are in different stages of discussion, organization, and capitalization. Some concerns are fully organized and capitalized; in other cases conditions have been canvassed, and organization seems probable. Nearly all these projects are likely to materialize in the future, provided questions affecting the beet-sugar industry are settled.

This list includes only such projects as came to my attention during my investigations of the past year, and is authentic as far as it goes. There are doubtless others of which I have no definite information. To install these factories would require an investment of $49,000,000. In addition, they would require annually a working capital of $9,080,000. They could purchase from the farmers, annually, beets to the amount of $14,700,000, besides a great many other crude materials, and would employ a large number of laborers.

LIST OF PROPOSED FACTORIES.

Location.	Nominal daily capacity.	Cost of construction and equipment.
	Tons of beets.	
ARIZONA.		
Phoenix	1,000	$1,000,000
Glendale	500	500,000
CALIFORNIA.		
Hemet	500	500,000
Hueneme	500	500,000
Anderson	1,000	1,000,000
Tehama	500	500,000
Los Angeles	1,000	1,000,000
COLORADO.		
Fowler	500	500,000
Denver	500	500,000
Fort Collins	1,000	1,000,000
Arveda	500	500,000
Prowers County	1,000	1,000,000
Longmont	1,000	1,000,000
Amity	500	500,000
INDIANA.		
Shelby	1,000	1,000,000
IOWA.		
Mason City	500	500,000
Missouri Valley	1,000	1,000,000
Toledo	500	500,000
Storm Lake	500	500,000
Fort Dodge	500	500,000
California Junction	500	500,000
IDAHO.		
American Falls	500	500,000
MICHIGAN.		
Port Huron	500	500,000
Chippewa County	500	500,000
Racine	500	500,000
Grand Rapids	800	800,000
Lapeer	500	500,000
MICHIGAN—Continued.	*Tons of beets.*	
Port Austin	500	$500,000
Green Bay	500	500,000
Dundee	750	750,000
Caseville	650	650,000
Monroe	600	600,000
Saginaw	500	500,000
Owosso	500	500,000
Chesaning	500	500,000
Grand Rapids	350	350,000
Croswell	700	700,000
Monroe	800	800,000
Howell	500	500,000
Fowlerville	500	500,000
Cass City	500	500,000
Mount Pleasant	500	500,000
Omer	500	500,000
St. Louis	500	500,000
Mason	500	500,000
Pinconning	500	500,000
Charlevoix	350	350,000
Pontiac	500	500,000
Ann Arbor	400	400,000
St. Johns	500	500,000
MINNESOTA.		
Denmark	500	500,000
Little Falls	400	400,000
Newburg	500	500,000
Winona	500	500,000
Crookston	500	500,000
MONTANA.		
Hamilton	500	500,000
NEW YORK.		
Wellsville	500	500,000
Rochester	1,000	1,000,000
NEW JERSEY.		
Mount Morris	500	500,000
NORTH DAKOTA.	*Tons of beets.*	
Oaks	500	$500,000
Fargo	500	500,000
OHIO.		
Toledo	500	500,000
Sandusky	500	500,000
Norwalk	350	350,000
OREGON.		
Portland	500	500,000
PENNSYLVANIA.		
Shawmut	500	500,000
SOUTH DAKOTA.		
Aberdeen	500	500,000
Kimball	500	500,000
UTAH.		
Uintah	1,000	1,000,000
Bear River Valley	1,000	1,000,000
Gunnison	500	500,000
WISCONSIN.		
Sheboygan	350	350,000
Racine (4 plants)	500	2,000,000
Oconomowok	500	500,000
Waupaca	500	500,000
Watertown	500	500,000
Stephens Point	500	500,000
Beaver Dam	500	500,000
Burlington	500	500,000
Franksville	500	500,000
Kaukauna	500	500,000
WYOMING.		
Wheatland	500	500,000
Cheyenne	1,000	1,000,000
Total	.....	49,000,000

NOTE.—Owing to the ratification of the Cuban reciprocity treaty and the apprehension concerning ultimate annexation of the island, all but eight of the above-mentioned projects were abandoned.

Tariff agitation and enactments have resulted in the abandonment of 355 of the 419 projects which have been reported by the Department of Agriculture since 1898.

THE HIGH COST OF LIVING.

To Which Neither the Price Nor the Increased Per Capita Consumption of Sugar has Contributed.

Sugar is one of the few commodities which has not participated in the upward trend of prices, but on the contrary sells at a lower price per pound with each succeeding decade. This seems the more surprising because of the fact that the consumption of sugar has increased more rapidly than has that of any other staple food product, and increased demand usually means increased prices. The reason is that the possible supply of sugar is limitless and because owing to the indirect agricultural advantages of sugar-beet culture, the nations of Europe are willing to produce sugar for export at cost and even below the cost of production.

When, in 1870, the United States per capita consumption of sugar was but 32.7 pounds, the New York wholesale price was 13.51 cents per pound, and in 1910, when the per capita consumption had risen to 79.9 pounds, the price had fallen to 4.97 cents per pound. From 1870 to 1910, the per capita consumption increased 144.3 per cent, and the price per pound decreased 63.2 per cent.

Based on the average amount of sugar consumed by 2,567 workingmen's families in 1901, the Bureau of Labor shows that of the sugar consumed in the United States, 268.5 pounds per family was purchased for direct consumption, the balance of it entering into the manufacture of confectionery, condensed milk and other manufactures, the retail prices of which are not affected by the price of the sugar they contain. The figures of the Bureau of Labor also showed that for seventeen years the average retail price of sugar in the United States was 82½ cents per hundred pounds above the New York wholesale price, this 82½ cents being the cost of distribution.

Taking the above as a basis, the head of a family of five purchased 122.6 pounds of sugar in 1870 and 299.6 pounds in 1910. For the 122.6 pounds purchased in 1870, he paid $17.57, and for the 299.6 pounds purchased in 1910, he paid $17.36, or 21 cents less for 144.3 per cent more sugar. In other words, while the average workingman's family annually consumed 177 pounds more sugar than it did in 1870, the price per pound has been so reduced that the extra amount consumed does not contribute to the increased cost of living.

Notwithstanding this fact and the fact that, as shown by the Bureau of Labor, the total amount of money expended for sugar by 2,567 workingmen's families was but 5 per cent of the total amount expended for other food commodities, and the further fact that the price of sugar in the United States is lower than in any of the great nations of Europe except Great Britain, for several years the New York refiners of imported raw sugar have been endeavoring to induce the Congress of the United States to remove the duty from foreign raw sugar, claiming that the price of sugar in the United States is burdensome to the consumer and is contributing unduly to the high cost of living.

As shown by the Report of the Senate Committee on Finance, if the duty on sugar were eliminated and the consumers secured the entire benefit, their total net annual saving would amount to 14 cents per capita per annum, with a reasonable certainty that after the refiners, by a temporary reduction in the price of sugar, had destroyed the domestic beet sugar industry, their only competitor, they would fix the price of sugar as high as it is to-day and absorb the $50,000,000 National revenue now collected annually on imported raw sugar.

In marked contrast with the trend of sugar prices, are the prices of other food-stuffs. The following table is based on the amount and cost of certain food-stuffs purchased by 2,567 American workingmen's families in 1901, as given by the Bureau of Labor, and shows the cost of the same amount of each product in 1910, based on the assumption that the advance in retail prices has kept pace with the advance in wholesale prices:

COST OF AVERAGE QUANTITIES OF CERTAIN FOOD-STUFFS CONSUMED PER FAMILY, 1901-1910.

	Quantity consumed per family in 1901.	Cost per family in 1901.	Cost of same quantity in 1910.	Excess cost in 1910.
Fresh beef . . . . . lbs.	349.7	$50.05	$65.06	$15.01
Butter . . . . . "	117.1	28.76	40 57	11.81
Eggs . . . . . doz.	85.2	16.79	26.72	9.23
Milk . . . . . qts.	354.5	21.32	29 87	8.55
Flour and Meal . . . . . lbs.	680.8	16.76	24.84	8.08
Salt Hog Products . . . . . "	110.5	13.89	21.11	7.22
Coffee . . . . . "	46.8	10.74	15 79	5.05
Lard . . . . . "	84.5	9 35	13 18	3 83

BEET SUGAR IN FRANCE FROM 1800 TO 1900.

Cultivation of the Beet.

By Jules Helot.

Honorary Secretary-General of the Association of Sugar Manufacturers of France; Vice-President of the Chamber of Commerce of Cambrai, Cambrai, 1900.

"It should be stated, moreover, that if the cultivation of the beet contributes in an indirect but undeniable way to increase the richness of the soil by the fertilizers and the beneficial means of cultivation which it necessitates, in contrast with every other crop, it does not take from the soil a single one of the fertilizing elements.

"The elements that go to make up the sugar of the beet—carbon, hydrogen and oxygen—are not taken from the soil but from the air, and those are the only elements taken from it. All the matter, on the other hand, which enters into the composition of the beet, the vehicle of the sugar, and which proceed from the soil, are completely restored to it either in that they are left immediately upon the very ground where the beet has grown, as in the case of beet tops (leaves), or in that they are later paid back indirectly in the form of manure, as in the case of the dregs from the manufacture of sugar, or in that they serve as feed for cattle whose dung fertilizes the soil, as in the case of the pulp of the beet."

THE INFLUENCE OF THE SUGAR BEET ON AGRICULTURE.

Richard Woge.

Member of the Faculty for Teaching the Higher Branches of Philosophy, at the University of Leipzig. Leipzig, Germany, 1892, 65 pages.

"This shows how well wheat repays intensive farming which it gets on manufacturing estates. Further inspection shows that the highest average yields were obtained on beet estates, and that even the minimum, comparing the four grains, exceeds the maximum on the nonbeet growing estates."

Woge gives the following average figures of yields on the Bennigsen estate for the four years 1869–1873, before the introduction of beet culture, and the ten years, 1880–1890, after beet culture was introduced.

	Yield before beet culture (bushels per acre).	Yield after beet culture (bushels per acre).	Per cent increase because of beet culture.
Wheat	24.5	41.3	68.6
Rye	28.4	40.8	43.7
Oats	61.8	75.3	21.8
Barley	23.2	43.5	87.5
Potatoes	218.6	238.0	8.97
Rape	23.2	48.8	110.0

In another table, Woge shows not only the increase in the four cereal crops in bushels, but in the weight of straw as well. The table is as follows:

Increase in yield of grain and straw due to rotating with sugar beets.

	Grain (bushels per acre).	Straw (pounds per acre).
Wheat	16.7	3,009.6
Rye	12.4	2,083.2
Barley	20.3	1,753.8
Oats	13.1	839.0

Woge says:

"The cost of production in the intensive systems was very high, for since in nonbeet-growing systems we estimated 225 marks per hectare; in beet-growing systems it was 433 marks. The net profit, however, was 134 marks, while in the nonbeet-growing system it was 93 marks, or 44 per cent excess net profit on the beet-growing estates.

"The extraordinary great influence which the sugar industry exerts upon agriculture has been numerically demonstrated in the preceding work, which was the purpose of the investigation."

THE SUGAR BEET.

The Most Important Crop of the Temperate Zone.

A Handbook for Practical Farmers, Especially for Sugar Beet Planters.

FERDINAND KNAUER.

Halle, Germany, 1861, 180 pages. Republished, 1876, 1906.

In his Preface, Knauer says:

"I am not a theoretical book writer, but a practical farmer and I request my readers to accept my apologies if they find me lacking in theoretical knowledge as regards composition and expression.

"Go out into the world thou first-born of my pen and try to convince the readers that it only was love for the cause that made me write down my experiences in order to publish to the world at large that thou has been written only because I was impelled to be useful to my fellow men."

"Having indicated the importance of the beet as a desirable cultural plant in the preceding paragraphs and titles, therefore in the following we will prove how enormously beet culture together with the beet sugar industry has and will further increase the national wealth of all countries where it has become established. * * *

"The complete changing of the entire system of agriculture was reserved for the beet germs. The desirability of its culture soon convinced the farmers of all countries who are otherwise hard to approach, that land rents and crops could be increased to an unhoped for height simply by increased beet culture. Though 30 years ago a little over $4 annual rent per acre was unknown for the best Prussian lands, nevertheless it is now easy to pay $8 to $10, according to conditions, per acre, per year, where sugar beets thrive and yield; from which it results that land values and rents have doubled since the introduction of the beet. As a consequence the national wealth of the landlords has nearly doubled. From our point of view this result must make us enthusiastic regarding the beet, since its value is of such magnitude that it is impossible to express it in figures. If we remember that since beets have been grown the tillage of other agricultural lands has increased very considerably, every thinking man will understand that double the population and two to three times as much stock can easily be supported on the land tilled at present. Though 40 years ago, using fallow land for the 3-crop rotation, the production of 6 scheffels of grain per morgen of plowed land was a great deal for intelligent farmers, now we have instances of estates which while planting one-quarter of their acreage to beets, harvest 10 to 12 scheffel per morgen for their entire area. * * *

"For many years agricultural associations have busied themselves with the question of the advisability of deep culture. While these gentlemen ranged around the green table discussed the question in lively debate, the beet, in all silence and modesty, without discussion, introduced deep culture, since it did not concern itself with such deductions as the presence of sufficient or insufficient fertilizer or the necessary draft power. She simply says, 'Farmer, provide howsoever, but I do not yield in flat soil—I must have deep culture if I am to grow perfectly, because my mother, nature, drives me downward and I will follow your instruments with my taproot even if you plow 3 to 4 feet deep.'

"Thus, the beet farmer was forced to burn the old plow which made a furrow only 4 to 6 inches deep, and to secure instruments which would make a furrow bottom twice, yes, three times as deep.

"The result was surprising, since the old theory about dead soil was literally killed, and treasures—*i. e.*, valuable inorganic soil constituents—were turned to the sun and air, which together made these bodies assimilable by the plant through increasing decomposition.

"Thus a rich tilled soil originated, and in a national economic respect it can not be too highly recommended that all useful soil be cultivated deep before planting. When the Lord God had so far completed the earth by means of eruptions and precipitations that a fertile belt (called 'alluvium') had placed itself around all primary, secondary, and tertiary formations, the Lord God wished that this humus soil be subject to man—*i. e.*, that it should nourish him and his millions of descendants, yes, decently.

"In order that this storehouse of tillable soil should not be depleted until its enrichment was understood, our Lord God, who made all wisely and good, placed a lot of obstacles into our divine soil itself. The beet must first come. It was reserved to the beet to teach man how to obviate the obstacles and produce a deep tilled soil. Myriads of field stones lie in the northern part of the continent (called erotic blocks) in the alluvium, or,

most often, just under it. The shallow-plowing and short-sighted farmer avoided these, since they injured and destroyed his plow. However, the beet absolutely demanded deep plowing, since it takes valuable substances from the diluvium—for instance, from the marl. There was no other relief; these stones must be removed; and thus by subsoiling and deep plowing a doubly thick tilled soil was created, which is more resistant to all injurious climatic conditions than the flat; thus the plants it grows resist drought and water better. Clearly, considering this incontrovertible truth, the deep culture due to the beet has more than doubled the national wealth in soil.

* * * * * * * * * * * * *

"We have previously demonstrated, by example, how differently a farm pays with beet culture than without. We can prove this statement by hundreds of examples, but hope our readers will be convinced of this statement without these proofs. If this should not be the case, the beet districts of northern Germany give opportunity daily to convince one of the irrefutability of this statement, since the speed with which beet-growing estates improved through their increased draft animals and other stock and the resulting fertilizer, is very surprising; other farmers wished to help themselves more easily by applying artificial fertilizers.

* * * * * * * * * * * * *

"Beet culture gives us a medium of producing large quantities of manure in the very cheapest way; thus national thanks are due the beet for all the sums no more allowed to go to England and America which are retained at home to augment our national wealth, to improve our farms and produce manure. Justus von Liebig's warning, 'Farmers are following out a system of robbery,' is only too well justified and applicable to those farms which solely seek their fortunes in grain with little stock. Even though a farmer fallowed one-fourth his acreage each year, his plowed lands and pastures will become poorer in soil wealth, poorer in humus and mineral substances since every crop takes out potash in the exported grains, superphosphates especially; which valuable and necessary constituents can never be returned to the soil on an extensive grain farm; thus such farms become poorer in soil fertility from year to year. * * * Only on such estates in Saxony as plant a great deal of beets have built a dam to the unceasing process of depletion. J. von Liebig's cry of distress would have died out without any effect if men had not been present who at the first sound, who rightly appreciating the everlasting progressive depletion, sought and found safety from this danger in the progressive increase of barnyard-manure production. Beets were the agency of attaining this end cheaply and easily. * * *

* * * * * * * * * * * * *

"Small farmer, throw aside the old leaching and demoralizing three-crop system which many of you inherited from your fathers, which entails fallow wintering and summering; reach for the land and horse hoe with decision. Blessing will follow you, for hoed crops give fodder, fodder yields manure, manure yields grain, and grain yields money. * * *

"To whom has not been made clear by what has been said, that national wealth is endlessly increased by increased beet culture, since at the beginning of this text we have shown by examples that estates planting one quarter of their area to beets yet raise considerably more and better grain than from the whole area, this statement will be substantiated by all intelligent beet growers, and thus is proven how much the State should be interested in further beet culture and to protect the northern beet-sugar industry, since it produces bread as well as sugar for the population which has increased one-third in 20 years. * * *

"Beets and beet-sugar industry united abstract theory and abstract practice. Authorities renowned as chemists devoted themselves to agriculture in the beet industry, and thus agriculture was enriched by scientific power managed by scientists who taught us. * * *

"This must demonstrate to every farmer that the farm with extensive beet culture increases from year to year in its culture, while the other if not poorer at least does not increase in strength, and so remains stationary. * * *

"The small farmer can only take example from the large one, and since beets are destined to improve agriculture in the easiest manner, all intelligent farmers should join us in teaching our small colleagues how to raise beets, quantities of beets, to advantage. These people will then have fodder therefrom, fertilizer therefrom, much grain, and naturally from this, money and competence. We are not deceived that the cultivated soil of Europe can produce three times as much as at present without losing value itself. Since the more soil a crop produces, the richer and more productive it becomes in high culture and fertilizer production. * * *

"If the Government could have known that Europe and the Temperate Zone were destined to become the greatest sugar country of the earth, they would truly have had no cause to encourage emigration to America

and Australia; now all the emigrants would be able to secure sufficient daily bread, and it is certain that with the future increase of population the raising of sugar beets and recovery of sugar therefrom will and must appreciably increase. * * *

"No one dreamed that this beet, this sugar in the beet, could be so useful to agriculture and industry as we have seen it. No other cultivated plant would have been able to improve agriculture so greatly as this one, since only by intensive cultivation of the soil blessings and yields can be obtained from it. * * *

"Beet raising forced us to work our soil better, produce new implements, especially plows, which would give even better service than the spade. It taught and gave us a near approach to an ideal rotation—yes, possibly, to reach it, since through it we can alternate leaf and stalk crops. And here, since the sugar beet is a very desirable crop to precede summer grain and legumes, we will again lay down the law that the best preceding crop is the one which best prepares the soil physically for the following crop. * * *

"An entirely different spirit permeates the farmers since the introduction of beet culture. The people have since learned that it is better to plow deep and fertilize heavy; that from $30 to $45 worth of crops can thus be gained from 98 square rods in a year, and that $4.50 to $7.50 rent can be paid for good soil without fear of bankruptcy. Further, they have learned that the soil gets poorer and poorer on fallowing with good rotations and a small amount of poor stock. We have already said that beets forced the farmer to adopt rational deep culture and the introduction of garden culture, since it grows and yields only in deeply worked soil, free from weeds, which, by stirring with hand or power hoes, constantly remains subject to the useful influence of the air.

"Thus new life and action arose on field and plain which before had never been equaled. The old German wooden plow with its yard of mold board was burned, and well-constructed iron plows took its place; the harrow was improved, etc. The old destructive German roller which evened the soil like a barn floor was displaced by the desirable ring roller. Farm machinery manufactories grew up, the teaching of chemistry and mechanics were united with practice to accomplish the amelioration, *i. e.*, the better preparation, of the soil with the least effort. Thus we see garden culture equaled on our beet fields—yes, even excelled.

"We close our work with the wish that our readers will test all and retain the best, and that those not impressed with beet culture will be incited to busy themselves more with it, to the profit of their farms. Of those further progressed in agriculture than ourselves, we beg mild criticism; may they understand that in writing down our thoughts and experiences we aimed at the general good, since it is our firm belief increased beet culture is the greatest blessing for every land. * * *

QUESTIONS OF THE DAY CONCERNING MODERN AGRICULTURE WITH REFERENCE TO ROTATION OF CROPS.

PROFESSOR DR. K. VON RUEMKER,

Professor of the Science of Agriculture, at Breslau University, Breslau, Silesia, Germany, 1906. 70 pages.

"1. What are the relations of beet culture to our agriculture?

"The high yield of cereals and other grains in beet regions dated from the introduction of rational sugar-beet culture. Sugar-beet culture is without doubt the direct and indirect cause of the increase of gross and net yields of the entire agriculture, and, therefore, also of the soil values in the regions touched.

"The demonstration of the increase of the total yields of all other field crops due to beet culture and notices on the importance of sugar-beet culture for our agriculture, we find stated repeatedly in literature. * * *

"These expositions unanimously give that since the introduction of beet culture, in spite of the decrease of area planted to grains, the grain yields have considerably increased. * * *

"It results from the preceding, that just the opposite condition holds to that credited to the sugar-beet raising farmer. In fact, that sugar-beet culture has made possible a large increase in the quantity of grain that was and can be produced, but has not decreased it. Greater than the increased yields of grain are those in the stock raising.

"In fact we see in every case examined with this end in view, an increase of the total yields of the farm, an increase in wages, and an increase of wealth of the inhabitants of those sections raising beets, and therefore also an improvement in the mental and moral level of the inhabitants, an increase of the average education and standard of life and of the taxes yielded.

"As culturally improving and weighty as the introduction of clover raising was in its time, nevertheless, these advances can not be compared with the progress made in the total field culture due to sugar-beet raising on heavy land and rational potato culture on the lighter soils. Indeed, clover raising produces fodder, and it made possible a rational and economical conserving field utilization. It saved labor and decreased the cost of production. It gives the first basis for increased stock raising and increased fertilizer production. This was undoubtedly great progress, which we owe to it.

" However, hoed crops likewise give large amounts of fodder from the residues of sugar, alcohol and starch manufacture; also it facilitates and improves the introduction of rational rotation, and it helps to increase stock raising and fertilizer production. However, it exceeded clover raising in a certain way over and above this. Thus—

" 1. Greater demands as to work in planting, caring for and harvesting;

" 2. Greater demand of more rational and richer fertilizing;

" 3. The sale of material from the farm originating solely from the atmosphere, namely, carbon, hydrogen and oxygen in the carbohydrates, sugar starch and in alcohol, while all the plant food due to the soil was returned for agriculture in a large measure in the residues and by-products of manufacture, and returned to the soil in fertilizer. Against this statistical advantage, clover raising could likewise throw its wealth into the scale, fixing nitrogen of the atmosphere by the aid of the well known bacterial symbiosis and thus by means of its rich root residues leave the soil richer in nitrogen and humus than it was at the time of sowing.

" Especially points 1 and 2, together with the statistics in point 3, are doubtless the main reasons for the influences of beet culture on the increase of the other agricultural yields.

" The sugar beet demands deeper plowing if it is to prosper; it thereby forces the removal of stones and other obstacles to cultivation; further, it requires the introduction of power plows, which are well known to do more perfect and quicker work than draft plows. Deep culture was followed by improvements of all agricultural machinery and even an increase in the construction and trade in agricultural machines. The old kinds of drags, rollers, harrows, drills, etc., were no more satisfactory. New and ever more new and better constructed machines were invented and used. People adapted themselves more to the various soils and their use, and the result of this specialization was naturally an enormous perfection and increase of the work of these special machines, by converting and saving the power of man and animals. The drilling of hoed crops was extended to all cultivated plants. Hand sowing and the broad-cast sowing machine were rapidly followed by the drill and dibble sower. Sowing in rows gave not only the advantage of seed economy and more even distribution of seed in a horizontal and vertical direction, whereby more rapid and even germination, a more even development and maturity of the crop resulted, and not only more but also qualitatively better harvest were obtained, but it also gave the possibility of freeing the field from weeds, and by hoeing all the field crops, the soil could be kept open and more intensively subjected to the influences of the atmosphere. Thus it became possible to influence the physical consistency of the soil in the most favorable manner, to retain the water contained in the soil more economically, to assist the bacterial activity in the soil, and thus to exert an influence on the nitrogen addition from the atmosphere; in short, the introduction of hoed cultivation resulted extraordinarily favorable in a physical, chemical and physiological way on the yields, so that the increase in cost of production was overwhelmingly covered, and in most cases even brought good interest.

" The deeper and more careful one learned to till the soil by the aid of beet raising, the more intense was the demand for richer and more careful fertilization. The development of the plant feeding philosophy since Liebig, just coincided with it and yielded mediums of knowledge and material by means of which barn-yard manure fertilization could be amplified by the addition of special fertilizers in the best and most economical manner. Thus it gradually became possible to so far improve the conditions of vegetation, not only of the beets, but of all other agricultural plants, that one was soon obliged to search for new varieties which exceed the ordinary kinds in yield, and these improved cultural conditions, by means of commensurate higher yields, would be met by higher interest.

"As a result of the German sugar tax laws at that time, one strove to make the sugar beet, the raw material in beet-sugar manufacture, richer in sugar by suitable individual selection, by the aid of polarization which was first used by Rabbethge and Giesecke in Kl. Wanzleben in 1862, while in France, Vilmorin adopted this method of selection as late as 1874. These methods in breeding were accompanied by a surprising result and the sugar yield increased from year to year, so that with the simultaneous improvement in extraction in the

factories, the number of cwt. of beets necessary for production of one cwt. of sugar decreased from 18 to 20 at this time, to 7½ in Germany in 1901–02. * * *

"The origin of this intensive agriculture, whose development is only briefly indicated here, is to be found in the development of a rational method of sugar-beet raising. The impulse to progress in other fields indicated here, arose from it and from natural necessity, member by member, united in this chain.

"The progress obtained in these fields, which at first seems to be in absolutely no relation to beet culture, was naturally applied in other branches of agricultural industry, where they entered and were taken up. It is, therefore, no exaggeration to state that sugar-beet culture was and is the high school of modern intensive agriculture; it is its source and at the same time developer and school-master. * * *

"The organization of the farms was largely affected by beet raising, so that strict rotation progressed to free agriculture, or frequently even garden culture resulted in a high degree, only maintaining the principles of rotation in as far as it was necessary physically or appeared profitable. Otherwise one confined himself to no hard and fast rotation, but adapted himself to the conditions of market. In a much higher degree than was previously known, though entirely new and improved, a factor became dominant, namely, merchantlike consideration and calculation. Careful book-keeping entered into the farms; one learned to carefully calculate the various branches of industry. As this indicates possible errors more readily, losses were avoided and profits obtained, which would have escaped without question without this sharp numerical picture.

"In concluding this subdivision, it should be remembered that beet culture increases the amount of work on the fields and that in that it gave profitable incomes to a large number of adults and children, and that it has helped to increase wages on the farm.

"The rich residues and by-products of beet culture and sugar manufacture have increased the array of native fodders, which allow us to decrease the purchase of imported fodder by many millions, if one wishes to still further utilize these products than before. But even now, the pulp, molasses, leaves, heads, etc., are so valuable a quantity of fodder, that without them a large area of agriculture could not dream of increasing its stock to the present limits. * * *

"In short, we see from this sketch that beet culture is in fact the basis of our modern and intensive industrial agriculture; that it not only assisted agriculture greatly, but that it increased our entire soil culture, large and small, in whole and in part; stock raising and agriculture and calculations were advanced, intensified and sharpened; that it raised the spiritual and material condition of all regions participating and even the neighboring areas. Beet culture is the lever that supports and carries our modern agricultural industry on a better foundation. Raising the axe against this point, would strike against agriculture and against the possibility of feeding our people with their own bread, and against a considerable part of our national wealth in a manner such that it could not be more destructive.

"Beet culture, therefore, is not only valuable and important to our agriculture, but also to our national economy. It is almost impossible that it can be replaced by other means on account of its peculiar influence on the elevation of our entire national culture, as is seen from this sketch."

EXPERIENCES IN PROFITABLE SUGAR BEET CULTURE DURING MANY YEARS.

A. F. Kiel, Sugar Beet Expert.

Reindoerfel, near Breslau, 1900. 60 pages.

"Many farmers discontinued beet raising at that time [1884], in most cases only for a short period, because they thought it impossible to raise them at the low prices, and yet this was an error. A drop of 25% to 36% in the price of beets seemed fatal, but a drop of 40% to 45% in the price of wheat and 50% in the price of rye has to be borne, as many other conditions. In this connection those farmers forgot that the culture of the beet benefited the other crops, as well as the fact that it is scarcely possible to find a substitute for the beet crop. * * *

"To this was added the conviction that the better utilization of the soil on large areas had caused an increase in the wealth of the total population, and that this fortunate condition would naturally be reversed if it was necessary to return to the old system of agriculture, and the retrogression would go even beyond the starting point, because since then unfortunate conditions had arisen with respect to some conditions."

A STATISTICAL INQUIRY INTO THE EFFECT OF THE SUGAR-BEET CULTURE.

The Influence of Sugar-Beet Culture on Agriculture and Rural Economics.

DR. GUSTAV HUMBERT.

A Pupil of the Celebrated Agricultural Scientist, Dr. John Conrad, Professor of Economics at Halle University, Halle, Saxony, Germany.

Published at Jena, 1878, 114 Pages.

"As a basis for his statistics Humbert selected 31 large and middle-sized estates in the Province of Saxony. The data he used were obtained from the original accounts of the 31 estates in question, and cover a period of 10, in some cases 20, and even 30, years. The figures used for comparative purposes are, in most cases, 10-year averages, though in some cases they cover two decades, 1855–1864 and 1865–1874, as affected by the introduction of beet culture into the cycle of rotation. Twenty-six of the estates produced beets, and five of them produced no beets. Humbert states that the soil of the nonbeet estates was of slightly better quality than that on the beet-growing estates, and that they had the further advantage of being larger estates. He says that the difference in the methods of cultivation between the beet-growing and the nonbeet-growing estates consisted primarily in the elimination by the farmer of the idle fallow fields and the partial substitution of beet raising for the production of fodder plants and meadow grasses. The statistical analysis of the figures of combined yields shows that under like conditions, *i. e.*, given like climatic and soil conditions, the yield of the beet estates was almost 45 per cent larger than that of the nonbeet estates. His final table is as follows:

	Average per acre of total area.			Average per acre under crops.			Maximum yield during period.	Minimum yield during period.
	Beet estates.	Nonbeet estates.	Excess.	Beet estates.	Nonbeet estates.	Excess.		
			Per cent.			*Per cent.*		
Wheat . . . . . bushels .	35.4	29.6	19.6	36.0	31.1	15.7	42.5	23.5
Rye . . . . . do .	31.1	28.9	7.6	30.1	28.4	5.9	33.5	20.6
Barley . . . . . do .	43.5	33.7	29.1	45.7	35.5	28.7	53.1	29.4
Oats . . . . . do .	57.5	43.8	31.3	60.7	43.1	40.8	80.8	31.8
Peas . . . . . do .	27.8	19.1	45.5	29.3	16.8	74.4	52.3	16.0
Rapeseed . . . . . pounds .	1,246	1,207	3.2	1,270	1,071	19.4	. . .	. . .
Potatoes . . . . . bushels .	203.6	187.1	8.8	212.7	199.6	6.5	232.0	154.7
Beets . . . . . pounds .	24,465	. . .	. . .	28,919	. . .	. . .	. . .	. .
Seed beets . . . . . do .	1,717	. . .	. . .	1,865	. . .	. . .	. . .	. . .

" We must especially draw the attention of the readers to this fact, that on farms where the highest yields were obtained, beet cultivation was carried on, and not a single beetless farm figured among the averages of extraordinary large harvests referred to above. The beetless farms can not stand the expense of artificial and animal fertilization, nor the increased expense of teams and hand work and it is only on beet farms where an increased outlay brings correspondingly large returns. Wherefore it is proved that a maximum yield reported anywhere always refers to beet farms and that the yield of beetless farms in general is always inferior to the former.

" But we also must consider the minimum average yields for they show clearly that notwithstanding all efforts it is not possible for the farmer to govern the yield even in the best soil or to govern nature by counteracting the influences to bring about the bad harvest. It is quite natural that on beet farms which necessitate deep culture, fertilization, the climatic extremes, dampness, wet weather, dry weather, do very little damage, or not so much as on other farms and that as a whole, harvests are obtained that approach the general average and consequently failures in crops come more rarely or are scarcer than on beetless farms. It is remarkable that in comparing all farms in general and the yield thereof, that the highest average yields occur on beet farms only, whereas the lowest yield is always reported from beetless farms. And this result has been obtained from soil, similar in quality and farms similar in area. This peculiarity is noticeable also in a ten yearly average yield calculation—whether the statistics refer to the highest or lowest season's yield. The highest average yields are noticeable also in cereals. On beetless farms the harvest of cereals was lowest, and when cereals were cultivated on beet farms, the highest cereal harvest was obtained. We must emphasize the fact that with all cereals the lowest average harvest occurs on beetless farms and all kinds of cereals, if planted on beet farms, give a higher average and that the lowest average on beet farms is higher than the highest average on beetless farms. The influence of beet culture is usually noticeable after a period of three years from the time of its introduction. With wheat, barley, oats and peas, the higher averages are noticeable and superior on beet farms than on beetless farms, although somewhat lower with rye and potatoes, which is easily explained by the fact

that the more acreage the beet claims, the more it is necessary for the farmer to plant potatoes, if any, on the inferior part of his farm. This is also true with rye put side by side with wheat, as rye is also treated by wheat in the same stepmotherly way as the potato is treated by the beet, whereas beet cultivation has gained in extent by the diminution of potato cultivation, this is not the case with wheat, which has maintained its previous position in the list of cereals, only through deep root culture being carried on on the farms, through better cultivation of the soil and fertilization, and these items have also favorably influenced other kinds of farm grains. If the increase of cereal harvest has been due to the cultivation of the beet and which has been abundantly proved in the foregoing, it is only necessary to point out at present the periodical, enormous well-known yield in straw. Unfortunately we could not give detailed statistics for this item, but the colossal mountains of straw which surround the sugar factories everywhere, where beet cultivation is carried on, the quantity of straw also left over from previous seasons (in some instances straw is kept in stock for two years), all this proves that in spite of the fact that cereal cultivation has diminished, in individual localities no scarcity of cereals or straw is noticeable, for the abundance in good seasons suffices to counterbalance bad seasons. Although it could easily be proved for individual farms, it is unnecessary, for nobody will doubt, especially the honest inquiring mind that is acquainted thoroughly with localities in which beet cultivation is carried on—that beet cultivation has also materially helped to increase the straw yield of all kinds of cereals.

* * * * * * * * * * * * *

"One circumstance will always contribute to diminish stock raising on beet farms, for it is on these farms that cultivation by machinery has become general, team animals are not as indispensable as formerly, which is noticeable on farms reported within the last decade. But as the residue of the factories has to be utilized, it will be necessary to maintain a good stock of cattle. It can not be asserted, as has often been done, that beet cultivation prejudices and diminishes animal products; on the contrary, the factories of beet localities are placed in a position to supply the districts surrounding them with nourishment for animals whereby each farmer is vastly benefited. This is proved by the following fact: Most sugar factories are in the government district of Magdeburg; nevertheless, it was just in these districts that the increase of animals from 1864–67, when calculated per head of large animals, was largest, we should say almost the largest in the whole Prussian kingdom, namely, 8.86%, a circumstance which is truly and strikingly remarkable. * * *

IMPORTANCE OF THE CULTIVATION OF HOED PLANTS, ESPECIALLY SUGAR BEETS, FOR THE PURPOSE OF INCREASING THE YIELD OF CEREALS AND THE PRODUCTION OF CATTLE.

WILHELM LILIENTHAL,

Professor of Natural Sciences and Mathematics at the University of Heidelberg, Germany. 1895. 100 pages.

"Besides the above national aspects, agricultural conditions are of much more importance. It is entirely untrue that sugar beets and potatoes for distilling, by reason of the land occupied, be it large or small as compared to the grain land, decrease the production of bread grains. On the other hand, they appreciably increase it.

"To thoroughly prove this, and especially by figures, is the main purpose of this book.'

The basis of Lilienthal's figures is shown by the following quotation from his dissertation:

"The great dislike of the farmer for book-keeping in general, as well as the incompleteness of the books on most estates where such exist at all, for a series of years, was the first difficulty encountered. A large number of accounts, which had kept sufficiently detailed accounts for our purpose, before and after the raising of beets, had to be considered incomplete for our purposes, since conversions of various kinds, such as separation of sale and cost price of land, change of management, etc., made a definite determination of this influence impossible. It can thus be understood why our calculations are based on only eight estates.

"A smaller number of such estates in which changes other than those due to the introduction of beet culture must give a clearer picture than a larger number of estates in which other changes than those due to beet culture took place.

"In all calculation to determine the relation before the introduction of beets, they are based upon the last five or ten years before the change. It is self-evident that to determine the influence of a condition, all others

must not change. That therefore an average price must be used for the grains. This has been calculated for the last twenty years, in which time all the latter mentioned estates took up beet growing. The prices of the two highest and lowest years were neglected."

Lilienthal selected for his purpose, estates which, prior to beet culture, were especially productive, considerably above even the present average German yield. Nevertheless, his investigations showed that the average yield of wheat on these estates, which had been 34 bushels per acre prior to beet culture, was increased to 41.5 bushels per acre, or an increase of 22% by reason of the introduction of the sugar beet into the rotation. The average yield of barley on these farms, before the introduction of beet culture, was 41.5 bushels per acre, and 48.1 bushels after beet culture, or an increase of 16 per cent. The yield of oats before beet culture was 60.9 bushels per acre, and after rotation with beets, 66.6 bushels, an increase of 9 per cent. The yield of rye before beets was 33.2 bushels per acre, and after beets, 34.8 bushels, an increase of 5 per cent.

In concluding his dissertation, Lilienthal says:

"Finally, it is not to be denied that the entire changing of agricultural conditions which, as we saw, was necessarily evolved with the introduction of beet culture, must exercise a decided influence not only on the material but also the social and mental development of the beet-growing farmer, especially the smaller ones."

THE SOIL AND ECONOMIC CONDITIONS REQUIRE THAT SUGAR BEET GROWING BE CONTINUED UNDER ALL CIRCUMSTANCES.

GENERAL SEKRETAER ZÜRN,
in "Deutsche Landwertschaftliche," 1904.

Under the terms of the Brussels Convention, bounties on exports of sugar were abolished in all European countries except Russia, and the ability of the German sugar industry to survive without bounties was in question.

The 500-page Deutsche Landwertschaftliche, the Year Book of the German Agricultural Association, is the most important annual agricultural publication in Germany.

Zürn says:

"According to my views, previous consideration of this question dealt too much with the financial results directly due to sugar beet growing. This question is frequently discussed among the farmers and in their journals: What shall become of our factories if we must discontinue beet growing? How much will our receipts decrease if we no more receive 25 cents per cwt. of beets? The special literature of beet raising has considered the question of discontinuance from a wider point of view, but alas! it is special literature and its influence on general agriculture has been much too small, a mistake the correction of which must be considered more closely in the future."

Zürn says that "one can tell from outward appearances whether a locality belongs to a well or poorly managed factory in many cases," and he leaves his discussion of the factories with the following statements:

"In which I will leave the question, whether in fact large factories always yield bigger returns than the medium sized, entirely open. All in all—if the utility of beet raising lay solely in its direct yields, if its problem was entirely this loss and the factory values—then the beet sugar industry would scarcely be justified in demanding a suitable protection, such as other more or less suffering industries demand. The greater right to protection of beet growing is due to its indirect results, whose loss would be disastrous to a large part of German agriculture."

Later on, Zürn points out the broad reasons why the sugar beet is better than are other hoed crops for increasing the yield of other crops grown in rotation. He says:

"The sugar beet responds to careful treatment as does no other crop. Therefore, it continually prods the farmer to give this. It repays the greatest fertilization rationally given, but does not entirely utilize it, but leaves of it quantities for the following crop as no other, and moreover leaves the soil in the best condition for two or three succeeding crops.

"Who can suggest a successor for the beet? Not potatoes, beans, clover, etc. These give, when followed by grain, more insects, lodging and blight than the beet, so that it has become customary with us, after a leaf crop (beans or clover) to plant beets in many cases.

"The only crop which approaches it, with respect to the following crop, is rape. Aside from the fact that increased rape growing can not be considered, this oil fruit is much too uncertain; further, though it does not demand, yet it yields better after fallow. Thus an equivalent of the beet does not exist. * * *

"Not last it should be noted that with cessation of beet raising, German agriculture would lose a great agricultural experiment industry which it previously had in the form of beet-growing districts; for there is no doubt that beet-growing districts preceded in the introduction of new plants and their improvement, unknown fodder, fertilizers, machines, etc., and also in their methods of management became examples for all Germany. This can easily be explained: Beets require much, but also yield much—especially study. Further it is not accidental that many of our well known seedsmen, such as Rimpan, Beseler, Struve, Dieckmann, Breustedt, live in beet districts. Thus from the beet districts there flows a continual stream of knowledge and instructive suggestions to German agriculture in general, and where this is not the case, beet growing promotes the increase of stock on the farm. * * * Finally, the condition of our agricultural laborers would be greatly injured if beet growing ceased. I need not explain the important part the labor question plays in agriculture; how great the inclination of farm labor is to go to town, even where conditions are very good, as with us. The labor question has partly been solved in beet districts, by the so-called Sachsengängeric (migrating population) about the pros and cons of which much has been written. In spite of this, we much value the establishment of permanent labor, especially those who are part farmers, whose wives and children are not as yet too proud to feed a few pigs or goats—in short, who still cling to the soil. * * *

"Just for this reason agriculture may ask for more protection for this, its most important industry—more important than any other industry. We often cite the enormous technical progress made by agriculture in the last 10 years. Do not forget that this progress is due to beet growing and its discontinuance would convert this progress into regress.

"The cessation of beet growing would be a national calamity of great significance."

THE PRACTICAL PLANTING OF SUGAR BEETS.

DR. HERMANN BRIEM.

Prague, Bohemia, 1895. 534 pages.

"Beet growing has attained such great distribution and importance that to-day we can scarcely imagine European agriculture without it. The beet is not only an industrial and trade plant which provides the basic stock for the cultivation of colossal acreage, but its introduction affects all European agriculture mightily. It made fallowing superfluous, pushed aside the three-field system, taught deep culture and the use of machines, destroyed weeds, demanded fertilization, introduced artificial fertilization everywhere, gave a correct and rational rotation, filled the barns with straw and the floors with grain, by means of increased crops that followed, and furnished the means of filling the stalls with stock.

"According to Dr. Eisben, further reasons why beet growing won friends among the skeptical farmers were: 'Gradually conditions improved the increased yields of crops following beets and helped mightily in opening the doubters' eyes. There was an ocular demonstration on the changing from stalk to leaf crops, such that it could not be conceived plainer and more conclusive.'

"A few historic examples may demonstrate this fact. On the estate Groena, in Anhalt, containing 250 hectares, no beets were grown up to 1837; from 1837 to 1853, a few hectares annually, experimentally; from 1853 on, 50 hectares per year.

"The annual grain production was as follows:

From 1832 to 1837, on an average,	3194	hectoliter	—	9,063	bushels.
" 1838 to 1844, " " "	3115	"	—	8,839	"
" 1845 to 1852, " " "	3168	"	—	8,989	"
" 1853 to 1856, " " "	3234	"	—	9,177	" (¼ of estate to beets)

"Thus, in the last four years, there was as much grain grown on 200 hectares as previously on 250 hectares, undoubtedly on account of the better culture by means of beet growing. * * *

"Similar experience was had in northern France. In one Arrondissement there were harvested before the introduction of beets, 353,000 hectoliter of wheat annually; after from one-quarter to one-third of the fields were annually planted to beets, the total production of wheat increased to 421,000 hectoliter, in spite of the smaller area planted."

GUIDE PRACTIQUE DU FABRICANT DE SUCRE.

BASSETT.

Paris, about 1860.

"The manufacture of sugar from beets is one of the most important elements of public prosperity. Resting on agricultural progress and the wants of a constantly increasing population, allied by reason of the cattle which it supports with the production of meat and bread, based upon improving cultivation, it renders to modern society the greatest services, at the same time that it attains for itself the highest point of prosperity and glory to which any industry ever had the ambition to aspire."

BEET-ROOT SUGAR AND CULTIVATION OF THE BEET.

E. B. GRANT.

Boston, 1867, 158 pages.

"I have said a direct net profit of $20 per acre, because it has been found in Europe that there is also an indirect profit on the beet crop in the large increase of crops succeeding it and in the cattle supported by the pulp. Experiments have conclusively proved that lands now yield from two to three times as much grain and support from eight to ten times as many cattle, in the beet-growing districts as they did before the beet was introduced. The great beet-producing districts of France are the grain districts and the cattle districts also. The three branches of agriculture always coexist.

* * * * * * * * * * * * *

"The basis of the agriculture of England is the turnip. In the best cultivated district of France, it is the beet. M. Barral, a celebrated writer on agriculture, says: 'I did not find any good crops except in those countries where an industrial culture prevailed, which is especially the case in those where the beet is cultivated.'"

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"Another writer says, 'all cultivators and economists are unanimous in recommending the cultivation of the sugar-producing plant, which is the source of deep tillage, heavy manuring, and increased production. No one believes now that it exhausts and impoverishes the soil, or that it hurts other crops: these are the prejudices of a by-gone age, which science and practice have banished, to set up in their place a recognition of benefits of the highest order produced by the culture of the beet.'"

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"L'Echo Agricole says, that 'all farmers who obtain first prizes at the agricultural exhibitions are either sugar manufacturers, distillers, or cultivators of the beet. Those who have adopted this branch of agriculture, either as proprietors or tenants, have already obtained astonishing results. They would be surprised if they did not carry off all the first prizes at the public exhibitions, and were consequently mentioned in the official reports of the government.'"

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"The culture of the beet involves the necessity of deep plowing, heavy manuring, and thorough weeding. The pulp from which the juice is extracted in the manufacture is an excellent food for cattle, the number of which has been increased, in the districts devoted to that industry, from eight to ten fold since the introduction of sugar making.

"The cattle furnish an immense amount of manure, which, applied to the deeply-plowed and well-weeded beet lands, enhances their productiveness for the cereal crops."

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"It has not only added immensely to the extent of the arable land, but has largely increased the productiveness and value of that already cultivated. It has enabled France to produce more corn at less cost than she ever did before, and kept down the prices of all grains, of beef, and of mutton. At the same time it produces for man sugar, meat, bread, alcohol, potash, and soda; it furnishes nutritious food for cattle, sheep and swine, together with hay and grain for the horse. In the opinion of eminent French statesmen, it has twice, within fifteen years, saved France from a famine.

"The historian Thiers has called it the Providence of the empire."

BEET SUGAR AS A BRITISH INDUSTRY.

Article in the *National Review* of London, August, 1911.

BY THE

EARL OF DENBIGH.

Lord Denbigh has been working for years to secure the establishment of the beet-sugar industry in the British Islands and I now am informed that the first British factory will begin operations this fall. Thus the last of the great temperate zone nations will have commenced to produce its own sugar from beets.

In this article, Lord Denbigh quotes from a report made by a deputation of three practical gentlemen whom the Maidstone Farmer's Club sent to Germany to study the beet-sugar industry. They say:

"To our minds, the great point to be remembered is that the year of least profit in any of our rotations is turned into the year of greatest profit on a beet farm. The farmer lends the produce to the factory and receives it back slightly reduced in feeding value, but with all the salts and minerals derived from the soil quite intact and ready to be returned to the land from which they were extracted. It is not surprising that a few years of this treatment increases the letting value of the land. Agricultural land in the neighborhood of Magdeburg has doubled in value since the introduction of beet growing. * * *

"The importance and value of beet growing is not to be gauged by the profits to be derived from the crop itself, but rather by its effect upon the whole rotation, or, rather, upon the whole economy of the farm. It amounts to a premium on good farming. Whereas an English farmer is commonly bound by contracts in his lease or agreement (which he constantly evades, and which he is now encouraged by law to evade) not to sell straw off the farm without bringing on a manurial equivalent, the beet-root grower has every inducement to use his straw upon the land."

On February 7, 1911, in a speech delivered in the House of Lords, Lord Denbigh said:

"The reason why I venture to urge this question with so much persistence is that we have to face two facts in this country. One is that the number of people engaged in agricultural occupations is about half what it was some 50 years ago; and the other is that whereas formerly we grew wheat for some twenty millions of our population, we now only grow wheat for between four and a half and five millions of our people, and there are something like 3,000,000 to 4,000,000 acres of land that years ago were under corn crops which have now gone down in grass, and grass very often of an inferior description. * * *

"Help and encouragement have been freely given in every country except our own for the purpose of establishing the sugar industry. You have only to look at what has been done in Germany, Austria, France, and America. On all hands it is admitted that wherever the industry has been established an enormous amount of good has been done, the value of the land has been raised, and land which was formerly out of cultivation has been brought into good agricultural value. There is plenty of land in Germany at this moment which was formerly practically worthless and growing nothing, but which is now growing excellent crops entirely owing to the sugar-beet industry. I was at Magdeburg the other day, the center of the German sugar industry, and was informed by one of the leading sugar authorities that if sugar beet was not cultivated there the production of corn would probably go down some 20 per cent; and if these results have been obtained in other countries I can not for the life of me see why we can not obtain similar results here in the British Isles in those districts where perhaps high farming has not been extensively practiced and where the production of the land is by no means what it ought to be. I submit therefore, most emphatically that there is nothing which would more surely tend to gradually bring back under cultivation the grass land which has grown out of corn crops than the creation of a successful and profitable sugar industry."

M. Dureau, about 1860, author of several valuable works on beet sugar, and also the editor of the "Journal des Fabricants de Sucre," Paris, says:

"The cultivation of the beet is getting to be highly popular.

"The president of an agricultural society is sure to gain all hearts when he talks about beets. No agricultural newspaper can abstain from entertaining its readers with accounts of the precious plant, and there is no farmer who does not introduce it into his fields with the view of its conversion either into sugar or alcohol. Everybody sings its praises; and surely none have a better right to join in its praises than we, who have always been its advocates for the sake of the industry with which it is allied."

JOHN STUART MILL AND THE DEVELOPMENT OF THE AMERICAN BEET-SUGAR INDUSTRY.

If John Stuart Mill, the great exponent of the doctrine of free trade, had in mind the present beet-sugar industry of the United States when he made his one exception to the rule of free trade, he could not have made the application more plain.

Nor could he have alluded more plainly to numerous American industries which, but for protection, never would have been established in the United States, and which now are so highly developed that they are able to compete successfully with the world.

The production of sugar from beets is a highly scientific process in both field and factory. In and about each factory thousands of people must be trained to the work before even mediocre results can be obtained.

When, in 1898, the beet-sugar industry began to develop in the United States, Europe had the advantage of a century's experience. Every station in her factories was manned by expert sugar makers and every beet raiser had the benefit not only of his own experience but of that of generations of forefathers.

Of our farmers, not one in a hundred had grown a root crop of any kind, let alone the scientifically bred sugar beet. Wherever new factories were erected, and wherever new factories are erected to-day, the first field results are far from satisfactory, either in tonnage to the farmer or to the factory in sugar content. In new factories able technical men are all but impossible to obtain. First they were imported from Europe, but these were overbearing and unable to manage the independent help of the United States. Now they are being trained in American colleges and technical schools, but years of training must be supplemented by years of experience.

The several hundred operatives of a factory are recruited from the surrounding farms, and they also must be trained.

We have 274,000,000 acres of well-defined sugar-beet land, equal or superior to the best to be found in Europe. As a whole, we have richer soils; a better agricultural climate; more live stock to produce the fertilizer; more and better farm implements and machinery; a more extensive, scientific, and expensive Department of Agriculture; a more intelligent and well-to-do class of farmers; and where our farmers have been thoroughly trained to the culture of sugar beets their yields exceed the heaviest yields of Europe, both in tonnage and sugar content. But taking the average, our yields are lighter, because of lack of experience.

Bearing these features in mind, the following exception noted by Mill seems to have a peculiar application to the development of the beet-sugar industry in the United States.

[From John Stuart Mill, Principles of Political Economy, Vol. II, Book V, Chap. X, p. 532, edition of 1864. D. Appleton & Co. New York.]

"PROTECTIONISM."

"The false theories of political economy which have done so much mischief in times past are entirely discredited among all who have not lagged behind the general progress of opinion; and few of the enactments which were once grounded on those theories still help to deform the statute-book. * * *

"Of these false theories, the most notable is the doctrine of Protection to Native Industry; a phrase meaning the prohibition, or the discouragement by heavy duties, of such foreign commodities as are capable of being produced at home. * * *

[From pp. 538–539.]

"The only case in which, on mere principles of political economy, protecting duties can be defensible is when they are imposed temporarily (especially in a young and rising nation) in hopes of naturalizing a foreign industry in itself perfectly suitable to the circumstances of the country. The superiority of one country over another in a branch of production often arises only from having begun it sooner. There may be no inherent advantage on one part or disadvantage on the other, but only a present superiority of acquired skill and experience. A country which has this skill yet to acquire may in other respects be better adapted to the production than those which were earlier in the field; and, besides, it is a just remark of Mr. Rae that nothing has a greater tendency to promote improvements in any branch of production than its trial under a new set of conditions. But it can not be expected that individuals should, at their own risk, or rather to their certain loss, introduce a new manufacture, and bear the burden of carrying it on, until the producers have been educated up to the level of those with whom the processes are traditional. A protecting duty, continued for a reasonable time, will sometimes be the least inconvenient mode in which the nation can tax itself for the support of such an experiment. But the protection should be confined to cases in which there is good ground of assurance that the industry which it fosters will after a time be able to dispense with it; nor should the domestic producers ever be allowed to expect that it will be continued to them beyond the time necessary for a fair trial of what they are capable of accomplishing."

SUGAR IN EUROPE AND THE UNITED STATES.

[Compiled by Truman G. Palmer, July, 1912. All in metric tons, 2,204.6 pounds.]

Country.	Population.	BEET-SUGAR PRODUCTION, SEASON OF 1910–11.			SUGAR IMPORTS.	SUGAR EXPORTS.	SUGAR CONSUMPTION.		IMPORT DUTIES AND EXCISE.		RETAIL PRICE OF GRANULATED SUGAR PER POUND, 1911. w		
		Factories operating.	Sugar produced per factory.	Total sugar produced. a	Aug. 31, 1910, to Sept. 1, 1911. d	Aug. 31, 1910, to Sept. 1, 1911. d	Aug. 31, 1910, to Sept. 1, 1911.	Per capita. p	Per 100 lbs. (r)	Total revenue derived from sugar. u	City at which quoted.	July.	November.
			Tons.	*Tons.*	*Tons.*	*Tons.*	*Total tons.*	*Pounds.*	*Dols.*	*Dollars.*		*Cents.*	*Cents.*
Germany	68,366,000	a 354	7,316	2,589,869	3,913	1,125,968	1,377,059	47.91	2.08	37,800,000	Hamburg	5.9	7.8
Russia in Europe	131,236,000	276	7,640	2,108,760	(g)	148,885	1,338,780	22.49	8.56	55,319,700	Warsaw	7.2	7.2
Austria-Hungary	51,300,000	208	7,501	1,522,785	(g)	811,535	663,879	28.53	4.02	38,963,200	Vienna	6.5	9.0
France	39,460,000	241	2,951	711,172	h 157,680	169,236	766,791	42.84	2.89	31,904,100	Paris	5.9	8.2
Belgium	7,452,000	77	3,678	283,222	7,146	155,444	129,698	38.37	2.23	3,658,600	Brussels	5.4	6.4
Netherlands	5,860,000	27	3,083	216,886	i 59,483	145,724	121,394	45.67	4.92	9,516,900	Amsterdam	8.7	10.9
Italy	34,565,000	35	5,240	183,400	6,546	. . . . .	158,354	10.10	8.67	19,476,400	Rome	14.0	14.6
Sweden	5,490,000	21	3,276	173,804	893	. . . . .	144,384	57.96	3.64	4,417,400	Stockholm	8.0	8.5
Denmark	2,730,000	8	13,625	109,000	28,369	1,522	104,304	84.23	1.22	1,437,000	Copenhagen	5.0	6.6
Spain	19,800,000	30	2,333	70,000	41	. . . . .	122,953	13.69	7.00	7,006,600	Madrid y	12.2	11.5
Roumania	6,960,000	5	10,000	50,000	. . . . .	. . . . .	33,408	10.58	6.56	k 3,858,050	Bucharest	10.1	11.8
Servia	2,850,000	1	7,443	7,443	3,133	. . . . .	10,264	7.94	5.26	k 794,861	Belgrade	8.7	9.7
Bulgaria	4,329,000	1	3,700	3,700	14,585	. . . . .	16,848	8.58	4.69	k 1,694,006	Sofia	k 7.2	. . . .
Switzerland	3,765,000	1	2,700	2,700	101,307	. . . . .	180,373	76.34	0.79	k 1,764,397	Zurich y	5.1	6.1
Greece	2,640,000	1	. . . .	(e)	7,885	. . . . .	10,777	9.00	5.06	k 879,568	Athens y	11.4	13.1
Portugal	2,898,000	. . . .	. . . .	. . . . .	46,174	. . . . .	50,089	46.10	2.43	k 2,473,628	Christiania	6.3	8.2
Finland	3,050,000	. . . .	. . . .	. . . . .	k 46,600	. . . . .	45,392	32.61	6.45	k 6,571,471	Finland	k 8.9	. . . .
Portugal, Madeira	5,770,000	(b)	. . . .	. . . . .	33,258	. . . . .	37,924	14.49	7.26	k 5,323,074	Lisbon	10.3	11.2
Turkey in Europe	6,130,200	. . . .	. . . .	. . . . .	k 40,000	. . . . .	37,815	13.60	(s)	. . . . .	Constantinople y	5.1	6.2
Asiatic Turkey	45,677,000	(b)	. . . .	. . . . .	l 1,752,906	52,836	1,899,513	91.63	0.40	14,408,982	London	5.0	5.5
Total Europe and Asiatic Turkey	444,822,200	1,281	6,275	8,032,741	2,304,319	2,611,050	7,199,944	35.68	4.43	247,232,907	. . . . .	7.84	9.03
United States	94,818,000	c 63	7,342	f 462,529	m 2,560,360	o 19,224	f 3,405,205	q 79.20	t 1.90	v 52,498,559	New York	x 5.69	6.94

a International Association for Gathering Sugar Statistics.

b Factories under construction for 1912–13 campaign.

c 5 factories.

d F. O. [illegible] imports and exports of Germany, Austria-Hungary, France and Belgium. Imports and exports of Holland and Russia, from governmental official publications, calendar year 1910. Other figures from British Statistical Abstract, calendar year 1910.

e No data

f Willett & Gray.

g Not any.

h 18,971 tons [illegible] balance from French colonial possessions.

i 8,702 tons from Dutch East Indies; balance, raw beet, both for refining and reexport.

k Estimated.

l British Statistical Abstract, calendar year 1910; importations consisted of 857,710 metric tons refined beet; 316,126 tons raw beet; 451,110 tons foreign cane, and 127,960 tons cane from British colonial possessions.

m Willett & Gray, calendar year 1910. Importations consisted of 489,974 tons from Hawaii; 285,128 tons from Porto Rico; 171,112 tons from Philippines; total insular, 946,214 tons free of duty; 1,431,888 tons from Cuba with 20 per cent concession from full tariff rates; 202,259 tons of other foreign, paying full tariff rates; total importations, 2,580,360. Adding to this the 202,699 tons of Louisiana and Texas cane, 514,963 tons of domestic beet, and 17,182 tons molasses and maple sugar, equals the total United States consumption of 3,405,204 tons.

o Willett & Gray, calendar year 1911.

p Otto Licht in Willett & Gray, Feb. 29, 1912, p. 92.

q Willett & Gray, Feb. 29, 1912, p. 92, calendar year 1911.

r British Board of Trade Reports.

s 11 per cent ad valorem.

t Average rate of United States duty collected on all dutiable imports for fiscal year 1911, 1.346 cents per pound. But 2,049 tons imported at rate of $1.90.

u Official figures.

v Fiscal year 1910–11.

w From reports gathered by the State Department from American consuls and published in H. Doc. 510, 62d Cong., 2d sess. The marked difference in July and November prices was occasioned by a shortage of over 1,000,000 tons in the 1911 sugar crop of the world, due to drought. In the original report of Consul General Griffith, of London, covering July, 1911, retail prices in London, the following quotations are given in United States cents per pound. In view of these quotations the London figure for July has been placed at 5 cents per pound.

	Cents.		Cents.
Centrifugal per pound	6	Preserving per pound	4–4½
Demarara do	4–4½	Icing do	6
Demarara, finest do	5	Icing, finest do	8
Granulated do	4	Pure Porto Rico do	5
Granulated, finest do	5	Real West Indian do	5
Castor, fine do	4½–5	Sparkling lump do	5
Castor, extra fine do	6	Double refined lump do	5–6
Loaf, good do	5	Lump dust, sifted do	4–4½
Tate's (loaf) No. 1, best do	5–6	Lump, for preserving do	4–4½
Tate's (loaf) No. 2 do	4		
Tate's (loaf) "After-Tea Cubes" do	6		

x The average New York retail price of 5.69 cents is derived by adding to the New York wholesale price of $4.90, 79 cents per 100 pounds, which was the average cost of distribution and retailers' profit, 1890 to 1907, as ascertained by the Bureau of Labor.

y Lump and loaf. No quotations given for granulated.

THE CHEMISTRY OF BEET AND CANE SUGAR

It is not uncommon to hear a housewife declare it to be impossible to preserve fruit or to make confectionery with beet sugar. Others claim that beet sugar is not as sweet as cane sugar and hence more of it is required to render a given degree of sweetness. Some claim to be able to distinguish beet sugar from cane sugar by the size of the crystals, some by the color, others by the length of time it takes a lump of sugar to dissolve in a cup of coffee or other liquid.

All of these conclusions are fallacious, for even a chemist, surrounded with all his scientific laboratory equipment, can not distinguish one from the other. Although derived from different species of plants, the refined product from the juice of the cane and beet is the same in composition, in sweetening power, in dietetic effect, in chemical reaction, in all other respects. Furthermore, if maple sugar were reboiled and passed through the process of refining, it would lose its aroma and flavor, which are wholly in the impurities, and the white crystals would be identical with those derived from sugar cane and sugar beets.

Pure sugar, whether derived from beet or cane, is as identical as is pure gold, whether mined in the Rocky Mountains or in the Transvaal. It would be as reasonable for a housewife to attribute the failure of her omelette to the fact that the hens which laid the eggs were Rhode Island reds instead of Wyandottes, as to attribute the failure of her preserves to the use of beet instead of cane sugar.

Inasmuch as one-half of the 17,000,000 tons annual sugar production of the world is derived from European sugar beets, to assume that this sugar can not be used for preserving fruit or making confectionery is to assume that where beet sugar is produced, the people either go without confectionery and preserves or that they import cane sugar with which to prepare them.

For fifty years or more the continent of Europe had depended almost exclusively on beet sugar. Aside from a small amount of French Colonial sugar and some 20,000 tons of cane sugar produced in Spain, the 5,300,000 tons of sugar annually consumed on the continent of Europe is beet sugar and no more attractive confections or delicious fruit preparations are produced elsewhere. Of the 1,900,000 tons annual sugar consumption of Great Britain, 1,300,000 tons is derived from Continental sugar beets. A few years ago 40 per cent of the United States importations of sugar were beet sugar and now from time to time when a shortage of sugar occurs in the West Indies, raw European beet sugar is imported into the United States, and it all emerges from our seaboard refineries as "pure cane sugar." This is not a misbranding, inasmuch as Worcester's definition of "cane sugar" is "Sugar obtained chiefly from sugar-cane, the sugar maple, and beet-root, and contained in a great many other vegetables."

Webster's Dictionary gives the following definition of sugar: "A sweet, crystalline substance obtained from certain vegetable products as the sugar-cane, maple, beet, sorghum and the like."

The Standard Dictionary defines sugar as: "A sweet crystalline compound ($C_{12}H_{22}O_{11}$) derived chiefly from the juice of the sugar-cane and sugar-beet, but contained also in many other vegetables." It defines sucrose (the chemical name for sugar) as: "The white crystalline compound known variously as cane-sugar, beet-sugar, maple sugar, etc., according to its origin, but identical chemically, having the composition $C_{12}H_{22}O_{11}$."

The Century Dictionary defines sugar as: "1. The general name of certain chemical compounds belonging to the group of carbohydrates. 2. A sweet crystalline substance, prepared chiefly from the expressed juice of the sugar-cane, and of the sugar-beet, but obtained also from a great variety of other plants, as maple, maize, sorghum, birch and parsnip." Sucrose is defined as: "A general name for the sugars identical in composition and in general properties with cane-sugar, having the formula $(C_{12}H_{22}O_{11})n$: Same as *Saccharose.*" It defines Saccharose as: "1. The general name of any crystalline sugar having the formula $C_{12}H_{22}O_{11}$ which suffers hydrolosis on heating with water or dilute mineral acid, each molecule yielding two molecules of a glucose. 2. Specifically, the ordinary pure sugar of commerce, obtained from the sugar-cane or sorghum, from the beet-root, and from the sap of a species of maple."

From the foregoing authoritative definitions it will be seen that there is no possibility of determining the source from which a pure sugar crystal is derived and to claim to be able to distinguish one from the other, is to assume the possession of a power of discernment and discrimination which the scientists of the world, aided by all the arts of chemistry and equipped with the most delicate scientific apparatus, have failed to develop.

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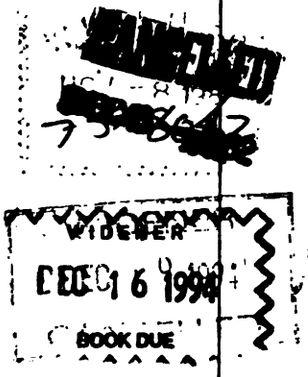
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